GOISILIGIAN BERNO Methods



OVEMBER 1942

TOUGH HAULAGE ON ALASKA HIGHWAY is encountered by Army Engineers at mud hole where trailer, with forged track mounting submerged in muck, is hauled by tractor-bulldozer.

FIVE PAGES OF ALASKA HIGHWAY PICTURES IN THIS ISSUE.



Inland Increasing War Production

New Blast Furnace to Add 1200 Tons of Pig Iron a Day

Only ten months have passed since ground was broken, and another Inland blast furnace is about ready to help America in this critical war of production. Designs were completed late last fall, and foundation work progressed rapidly throughout the winter months and early spring, despite all the difficulties of obtaining materials.

Steel erection was started before the summer began. Today, practically all the steel work is up—bricklayers are at work—and it is expected that the furnace will be making pig iron before snow flies. Iron from this new 1200-ton blast furnace

will be used to augment and maintain Inland steelmaking operations.

This new blast furnace is only one of Inland's new construction projects. A new electrolytic tin plate plant, two additional blast furnaces for the Defense Plant Corporation, and a new mill water supply tunnel are also among the construction jobs well under way by Inland engineers to help assure the steel needed by America for ships, tanks, guns, shells, etc. While Inland engineers rush new work to completion, Inland steelmakers are breaking production records.

SHEETS . STRIP . TIN PLATE . BARS . PLATES . FLOOR PLATE . STRUCTURALS
PILING . RAILS . TRACK ACCESSORIES . REINFORCING BARS

Dedicated to Victory

INLAND STEELED

CURRENT JOBS

.... and Who's Doing Them

BUILDINGS

Public — In Maryland, Charles H. Thompkins Co., of Washington, D.C., will construct a Naval training station to cost \$28,660,500. Successful bidders for housing contract in California were Robert McCarthy Co., Louis C. Dunn. Inc., and O. M. Rousseau, all of San Francisco, with bid of \$13,000,000. U.S. Martitine Commission will finance. Contract for permanent and temporary housing units in Washington went to J. C. Boespilug, of Seattle, with low bid of \$6,000,000. In Alabama, Algemon Blair Co., of Montgomery, will erect buildings estimated to cost \$5,000,000. War Department awarded building contract in Tennessee to Forcum-James Co., of Dyersburg, at cost of approximately \$5,000,000. Stone & Webster Engineering Corp., of New York, N. Y., was awarded contract to build additional facilities in Northumberland County, Pennsylvania, to exceed \$5,000,000. Building contract in Virginia, amounting to \$4,268,000, went to John McShain. Inc., Doyle & Russell & Wise Contracting Co., Inc., of Philadelphia, Pa. A. Farnell Blair, of Decatur, Ga., will erect buildings in Tennessee to cost approximately \$3,000,000. In New York, building contract estimated to cost \$2,000,000 including equipment, was awarded to H. K. Ferguson Co., of Cleveland, Ohio. Dormitory units are under construction in Alameda County, Calif., by Barrett & Hilp., of San Francisco, for \$2,875,000, to be financed by U.S. Maritime Commission. Housing contract in Texas was awarded to R. I. Brydon and S. J. Churchill, of Dallas, to cost between \$1,000,000. Scool,000. Low bidder for housing contract in Baltimore, Md., was Campton Construction Corp., of New York, N. Y., with low bid of \$1,756,000, Frame buildings are under construction in Texas by Randall Construction Co., of Amarillo, and J. L. Foxworth, of Dallas, with low bid of \$5,000,000. In New Mexico, additional temporary buildings will be built by G. Mora, of Houston, Tex., to cost more than \$1,000,000. Additional Naval facilities are under way in Port Chicago, Calif., by Duncanson-Harrelson Co., of San Franc

HEAVY CONSTRUCTION

School improvements are under way in Missouri by A. F. Blair, of Decatur, Ala., for approximately \$5,000,000. In Fort Worth, Tex., Central Contracting Co., Nolan Bros., Inc., and C. A. Wagner Construction Co., of Dallas, were awarded contract for improvements amounting to \$4,740,500. A bid of less than \$3,000,000 obtained for the Ebersbach Construction Co., of Tampa, Fla., contract to make improvements in Florida. Improvements are under way in Colorado Springs, Colo., by Geo. W. Condon Co., Peter Kiewit Sons Co., both of Omaha, Neb., and Ed. H. Honnen Construction Co., of Colorado Springs, for \$3,000,000. Contract for clearing, grading, draining, etc., in Comox, British Columbia, went to General Construction Co., Ltd., of Vancouver, B. C., for approximately \$2,200,000 on cost-plus-fixed-fee basis. In Scribner, Neb., air force installation is under way by Fox Valley Construction Co., of Appleton, Wis., for more than \$2,000,000 on cost-plus-fixed-fee basis. Another contract for construction in connection with air force installation in Wilmington, N. C., went to F. D. Cline, of Raleigh, for approximately \$2,000,000. Anderson Bros., of Tulsa, Okla, received contract to lay an 8-in. pipeline from Carrabelle to Jacksonville, across north Florida, for approximately \$2,900,000. to be financed by Defense Plant Corp.

HIGHWAYS .

Among recent highway contract awards are the following: Alabama: \$500,-000-\$1,000,000 to Wright Contracting Co... of Columbus, Ga. Georgia: \$208,811 to W. L. Cobb, Inc.. of Decatur; \$228,174 to M. J. Carroll Contracting Co.. Inc.. of Leesburg, Fla.; \$343,940 to W. L. Cobb, of Decatur. Indiana: \$509,167 to Calumet Paving Co.. of Indianapolis. Illinois: \$1,000,000-\$5,000,000 to S. J. Groves & Sons. of Minneapolis, Minn.; \$730,717 to Hurden Construction Co.. of Springfield; \$418,581 to Madison Construction Co.. of Edwardsville; \$899,946 to I. D. Lain Co., of Springfield Michigan: \$1,000,000 to Paul C. Miller, of Sparta. New York: \$2,000,000 to Rusciano & Son Corp., of New York City; \$286,117 to Harris Grand, of Brooklyn, N. Y.; \$318,166 to Arute Bros., Inc.. of New Britain, Conn. Nebraska: \$545,358 to Abel Construction Co.. and Dobson & Robinson, both of Lincoln; \$1,000,000-\$5,000,000 to Gene Hurley Construction Co.. of St. Paul, Minn.; \$1,000,000-\$5,000,000 to Stephens-Brown Co.. and Poole Contracting Co.. of Kansas City, Mo. Texas: \$500,000 to H. Page, of Austin. Virginia: \$483,031 to Heckler Bros., of Highland Springs; \$453,439 to Pendleton Construction Corp., of Wytheville. West Virginia: \$693,761 to Stellhorn & Beightler, of Columbus, Ohio.

NOVEMBER, 1942 330 West 42nd St., New York Construction Methods A Pictorial Survey of Current Practice, Equipment and Materials JOHN ABBINK, Publisher ROBERT K. TOMLIN, Editor A. E. PAXTON, Mans Editorial Staff: Vincent B. Smith, Paul Wooten (Washington) A. E. PAXTON, Manager N. A. Bowers (San Francisco) Nelle Fitzgerald PUBLICATION A McGRAW-HILL

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How RAIL PULLER salvaged for scrap unused steel from paved

How ALASKA HIGHWAY is being built to serve military purposes

How CULVERT across route of Alaka Highway was constructed of logs obtained from trees along right-of-way. —p. 44 How HAULAGE OF SUPPLIES for Alaska Highway is done with

How SOFT SPOTS along Alaska Highway were corduroyed with

CONSTRUCTION MEN in Navy's Seabee units are being trained to work and fight.

—p. 48

How OLD RAILS were reclaimed from city streets to supply steel

scrap.

How **ELECTRIC WELDING** saved replacement cost of new dredge.

— p. 53

How TWO NAVY DRYDOCKS were built of pumped concrete placed under water in dredged basins. —p. 54 How TREMIE BARGE was equipped with eight pipes to deliver

water How **SLIDING VALVES** permitted opening of pipe lines to deliver pumped concrete. —p. 55

How FLOATING PILEDRIVER with telescopic leads drove steel

H-piles for drydock.

How **CEMENT UNLOADER** was maneuvered in hold of barge by —p. 58 How CONCRETE BASE for blast furnace was built of pumped

How RADIAL CHUTES distributed pumped concrete to forms.

How CLEAR FLOOR AREA for Army structure was provided by

How WELDING JIG held two pieces of broken shaft in align—p. 60 arched roof of lamella type.

How FORMS were erected to receive concrete for "igloo" maga-

ine units at Army Ordnance plant How POWERFUL PNEUMATIC RAM pressed hot steel channels to

curved shapes for ship frames How POWER TOOLS sped shop fabrication of military huts

CONSTRUCTION METHODS. November, 1942. Volume 24. Number 11. Published Monthly, price 20st a copy. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York, N. Y. Subscription rates—United States, Mexico and Central and South American countries, \$1.00 a year, \$1.50 for two years, \$2.00 for three years. Canada, \$1.50 a year, \$2.50 for two years, \$3.00 for three years. Canada, \$1.50 a year, \$5.00 for three years. Solid for three years. Entered (or reentered) as second class matter December 16, 1936, at the Post Office at New York, N. Y., U. S. A., under the act of March 3rd, 1879. Printed in U. S. A. Cable address. "McGrawhill, New York," Member of A. B. P. Member of A. B. C. Contents copyrighted 1942 by McGraw Hill Publishing Co., Inc., 330 West 42nd Street, New York, N. Y., V.

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"He asked if he could use a little free air!"



"Oh, we finished the highway several days ago. We're now waiting for the first car to drive over it!"



"Try the bottom file, Miss Fall!"

INVISIBLE SABOTEUR!

PREVENT FALL SLOW-DOWNS . . . USE 'INCOR' 24-HOUR CEMENT



OLD weather sneaks up on you . . . slows down the job . . . exposes concrete to freezing risk. Fall is the dangerous season . . . warm sunny days give no warning of sudden temperature drops at night.

Don't get caught napping. Don't let cold weather sabotage your schedules. Speed was never as important as it is right now. 'Incor' 24-Hour Cement saves worry, time and money.

Heat mixing water... protect concrete promptly after placing. For early service and stripping strengths, supply enough heat to maintain 60° to 70° curing temperatures for 24 hours. 'Incor' pays its way in heat and labor savings... 2 or 3 days less protection on each pour. High speed schedules... 50% to 60% less forms.

LONE STAR CEMENT CORPORATION

Offices: ALBANY . BIRMINGHAM . BOSTON . CHICAGO . DALLAS . HOUSTON . INDIANAPOLIS . JACKSON, MISS. KANSAS CITY . NEW ORLEANS . NEW YORK . NORFOLK . PHILADELPHIA . ST. LOUIS . WASHINGTON, D. C.

LONE STAR, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS .. 15 MODERN MILLS .. 25-MILLION BARRELS ANNUAL CAPACITY



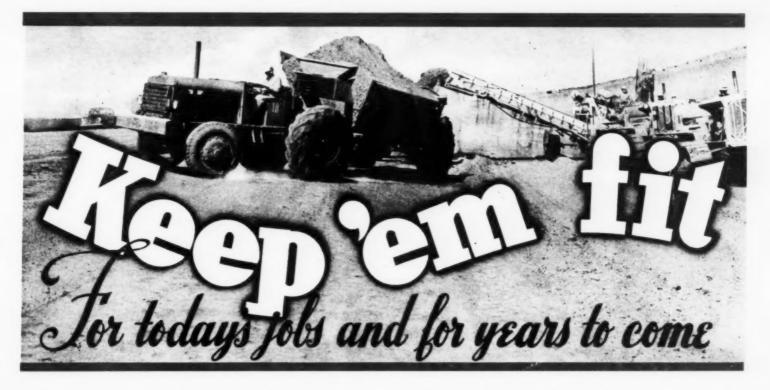


NEW OSGOOD WIDE GAUGE MOBILCRANE

Developed to meet special material handling needs, the wide gauge Mobilcrane uses no outriggers—is controlled by one man—powered by one motor—and carries its load at any angle. Conserves time, fuel and labor.







● Today every piece of construction equipment might well bear the admonition "HANDLE WITH CARE" even though it was built to withstand severe usage for years. New equipment in many cases is impossible to obtain and replacement parts are often not immediately available, so the proper care and servicing of your equipment is mighty important now.

Here are suggestions for engine care that will help to keep your Rear-Dump and Bottom-Dump Euclids operating efficiently and prevent costly repairs: Keep Engine Clean — Dirt and dust form a grinding compound when mixed with oil, and cause excessive wear on moving parts. Oil containers should be kept clean and covered; engine filler cap should be carefully cleaned before removing so that accumulated dirt cannot drop into the crankcase. The oil filler breather should be cleaned with gasoline every eight hours and immersed in clean oil before replacing.

Never Over-Drive or Over-Speed — Governor setting should not be increased; when hauling downgrade the load should not be allowed to over-drive the engine. Increasing the engine RPM reduces engine life materially and results in serious damage to parts.

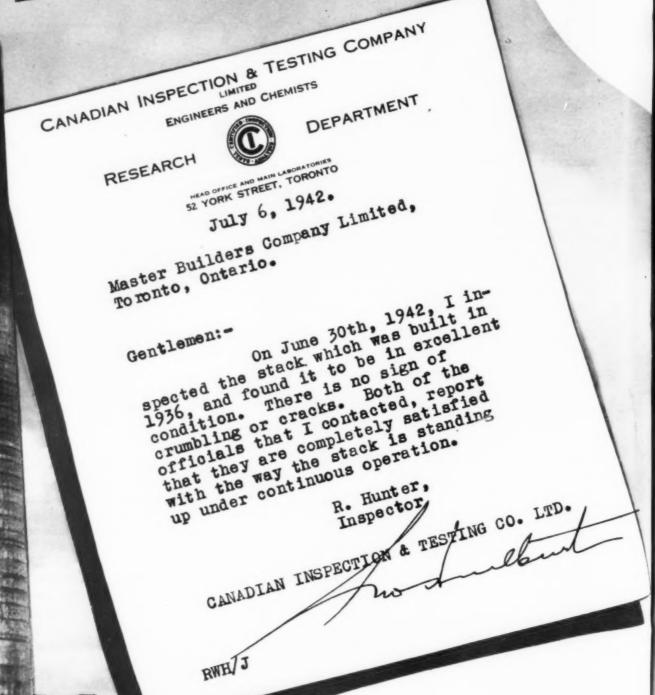
Keep all Bolts, Nuts and Connections Tight — Check and tighten every twenty-four hours to prevent leakage and resulting loss of efficiency as well as breakage of parts — an elementary precaution but an extremely important one nevertheless.

With good care your EUCLIDS will provide dependable performance long after they have been in operation for their "normal" service life. Making your EUCLIDS last longer now is not only good business, it's essential if there is to be enough hauling equipment available for mining operations and the construction of airports, naval bases, cantonments, and arsenals that must be completed in record time.

The EUCLID ROAD MACHINERY Co.



This kind of EXPERIENCE why.



1936

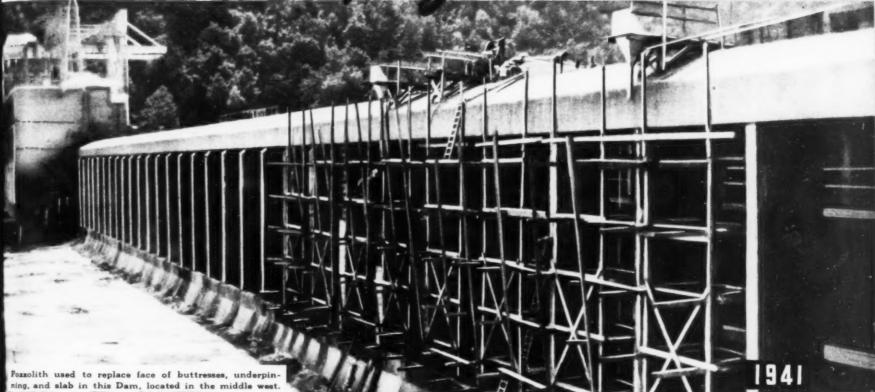
Pozsolith used throughout concrete in this 512 feet high stack built for a large Canadian corporation.

Tests made at the time of construction of this concrete stack showed that the compressive strength produced with Pozzolith was 5,000 pounds per square inch—double that specified.



MASTER

Pozzolith Cement Dispersion Was used in eosects like this ..



IMPORTANT replacements of heavy mass concrete on projects such as this has always been a costly procedure requiring much engineering skill, time, labor and study of materials responsible for apparent lack of concrete durability.

The exclusive functioning of Pozzolith (Cement Dispersion) in making major concrete replacements on this dam and others has led to its use on many new power projects where durability, watertightness, minimum volume change, and strength are of first importance-plus the handling requirements of workability, placeability at lower costs.

Experience based on several million yards of concrete and extending over a ten-year period, furnishes the performance facts on which builders can make sound decisions regarding the use of Pozzolith.

Proven technological advances in the field of concrete will add many years of maintenance free life to your structure.

Write today for illustrated Pozzolith booklet and Research Papers No. 36 "Economics of Cement Dispersion" (for mass concrete) and No. 39-"Cement Dispersion and Air Entrainment" (for runways and pavement).

THE MASTER BUILDERS COMPANY

CLEVELAND, OHIO

TORONTO, ONTARIO

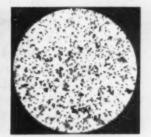
HOW CEMENT DISPERSION WORKS



Cement suspended in water UNDISPERSED

WITHOUT POZZOLITH

In a normal concrete mix, cement particles tend to bunch together, thereby (1) limiting hydration and (2) trapping water within the cement clumps. (See photomicrograph above).



Cement suspended in water DISPERSED

WITH POZZOLITH

Cement Dispersion drives these particles apart and (1) exposes their entire surface area to hydration. at the same time (2) making the water en-trapped in the clumps available for lubrication of the mix. (See photomicrograph above).

BUILDERS



TUBELESS TIRE INVENTED BY B.F. Goodrich

Sensational rubber-saving development promises big after-war savings for commercial users



A spical example of B. F. Goodrich development in truck tires

CLIMAXING a 50-year dream of tire engineers, The B. F. Goodrich Company announces an invention which eliminates the use of inner tubes in heavy vehicle tires.

Tested and Proved

The new B. F. Goodrich tubeless tire has been tested and proved both in the laboratory and on the highway and is now undergoing further impartial tests. While the amount of rubber saved by this new invention varies depending upon the size of the tire, the saving is approximately 7% to 17% of the rubber content of the casing, tube, and flap combined.

The Silvertown that doesn't need a tube has been made possible by a simple change in truck tire design plus a mechanical device the details of which are being kept secret in the interest of national defense. The tire is inflated just like any ordinary tire and tube — but instead of the air going into a tube, it goes directly into the tire and stays there.

If put into use during the war, the tubeless tire will be a major step in the conservation of America's precious rubber stockpile. That's good news to all of us. And it's good news to every truck and bus operator to know that

after the war inner tubes may become a thing of the past.

Remember, the inner tube is the source of much tire trouble. Do away with the tube and you have eliminated the cause of many, many failures! Mounting tires is easier. And repairs can be made quickly because there is no tube to consider. Just think what this would mean in terms of lower costs, fewer delays, and simplified repairs! It's too early to make promises — but here is a hint of more good news to come later. In war or peace, you can always look to B. F. Goodrich for leadership.

Here are a few of the many B. F. Goodrich "Firsts"

First in America to build cord tires

First to develop a black tread for longer tire wear.

First to make airplane De-Icers.

First to build a successful endless rubber track for vehicles.

First to make the Zipper overshoe.

First to offer American car owners synthetic automobile tires.

<u>First</u> to discover Duramin, a combination of chemicals that makes rubber resist ageing.

First in the field of vinyl elastics with the discovery of Koroseal.



r Ropes Last LONGER

Reading Time: 38 Seconds

Conserve steel for the nation by making every piece of equipment last longer. The operation of your machines depends upon wire rope. Make your ropes last longer. Here are a few suggestions:

★ Inspect, clean and lubricate all wire rope regularly. Tighten fittings. Be sure all fittings are properly applied, treated and maintained.

★ Be sure the rope is the proper one for the service. It should have proper strength, flexibility, resistance to abrasion, fatigue, crushing, heat, or other individual job factors.

★ If drums or sheaves are small or kinking tendency pronounced, specify LAY-SET PREFORMED, the rope that resists bending fatigue and kinking.

★ Check your sheave or drum grooves. Too large a rope or worn grooves cause pinching and rapid wear.

* Sheaves and drums that are too small cause needless rope fatigue.

★ If the rope deviates from the center plane of the sheave more than 1½ degrees, undue wear will result.

★ Keep sheaves aligned and bearings tight and properly lubricated.

★ Don't allow bad spooling on drums. Hazard LAY-SET PREFORMED spools evenly under most conditions.

★ Don't jam on power or brake. Jerky operation accelerates rope failure.

★ Don't let a load spin and twist the rope.

* Prevent rubbing of the rope against any standing part.

Get the experienced recommendation of a Hazard wire rope man. Specify Hazard LAY-SET PREFORMED for a rope that resists bending fatigue, kinking and snarling. Use LAY-SET because it spools better, is faster and safer to handle, lasts longer.

Keep equipment in good condition. Make it last longer.

HAZARD WIRE ROPE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT, CONNECTICUT

HAZARD LAY-SET Theformed WIRE ROPE

THE POMONA VERTICAL GASO-FUEL PUMP IMPORTANT NEW DATA ON HANDLING HIGH OCTANE GASOLINE The correct handling of high octane gasoline is vitally important to today's war effort. New and detailed data on this important subjectbased on actual tests—has been compiled by the Pomona Pump Co., manufacturers of the Pomona Gaso-Fuel Pump, and is now available for distribution. Critical information as to the effect of altitude, temperature and pressure on pumping capacities and efficiencies . . . proper design of the pump . . . correct and incorrect piping layouts for handling high octane, are a few of the many vital engineering facts given. Send the attached coupon today for your file of this valuable engineering data. It is free! Send me a free copy of your newly compiled data on pumping high octane gasoline. Position Name Address Company State. City.

POMONA PUMP CO. 120 BROADWAY, NEW YORK 4301 SO, SPRING AVENUE, ST., POMO



And it's tough on Diesel oil-But hark while we chant of a cold storage plant (Where you keep things, lest they spoil).

Back in April, 'Forty-yes, 1940-A big six-cylinder Dies' Went to work with a will, creating a chill-Its motto: "I aim to freeze."

Oh, the North Countree is a hard countree, And a year is twelve months long; Yet, it's perfectly true that in March, '42, This Diesel still ran like a song!

Oh, oil-buyers wary, oh oil-buyers chary, You can see that the moral is clear: Your Diesel runs swell-o on RPM DELO And does so for many a year!

modiningmondraway

E VER since the Marshfield Cold Storage Company of Marshfield, Wisconsin, installed its International UD-18 6-cylinder, 108-H.P. Diesel in April, 1940, the engine has been lubricated exclusively with RPM DELO. It has had 10,000 hours of continuous operation—and here are the results:

When the engine was thoroughly overhauled last March, cylinders showed less than .0035 inch maximum wear, pins were all tight and showed less than .002 inch wear, rod bearings were in "exceptionally fine condition." No wonder the company says, "we are indeed happy we selected RPM DELO as our lubricant and would not hesitate to highly recommend it."

STANDARD OIL COMPANY OF CALIFORNIA

RPM DELO is marketed under the following names:

RPM DELO Caltex RPM DELO . Kyso RPM DELO Imperial-RPM DELO Sohio RPM DELO Signal RPM DELO'

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity





"YOUR UNCLE SAM'S AIR CORPS

uses a lot of wire rope, Joe. Uses it right, too, because wire rope's got a lot of important jobs in this man's flying army: swinging half-ton eggs into bomb racks and towing planes out of hangars—big ropes for the cranes that "walk away" with damaged craft and fine cables for control in the air . . ."



Let's look at it this way: wire ropes, like people, pick up habits quick and easy, lose 'em hard. A wire rope's habits, in the Air Corps or any other place, begin when it's first spooled off the reel—and bad habits in a wire rope mean shorter rope life, sloppy service. When you spool a new line onto the drum, observe the following rules:

Wind the rope with special care the first time you do it. A little extra time spent on the first wind will pay big dividends. Guide the first layer carefully into place. With a smooth-faced drum, this means to make each turn fit snug against its neighbor without interlocking of strands. For best results, the dead wraps must be wound tight against the drum face.



Be sure there's a brake on the reel. This provides uniform winding tension which produces necessary snugness and prevents rope damage due to over travel of reel. Mount the reel on substantial cribbing some distance from the drum so that rope pulls off the underside. If the reel must be placed close and the rope wound to top side of drum, the rope should pull off top of reel, but here special care is needed in braking the

reel to avoid upsetting. Be sure the rope lead from reel to drum is straight and unobstructed.

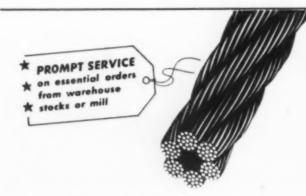
By following these simple rules in spooling new line, you'll be helping



that line to work better and longer. With Roebling "Blue Center" Steel Wire Rope, that means getting all the extra value built in by Roebling's 100 years of wire-rope engineering, means keeping that wire rope on the job for Victory.



JOHN A. ROEBLING'S SONS COMPANY TRENTON, NEW JERSEY Branches and Warehouses in Principal Cities

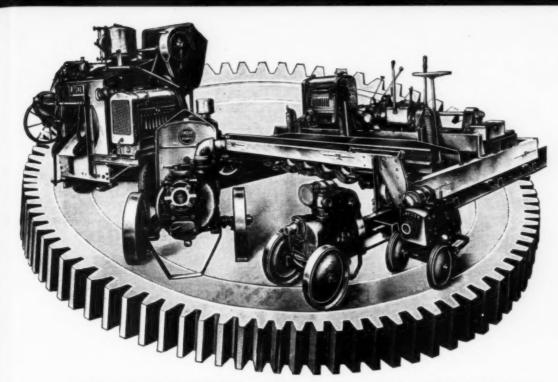


ROEBLING
"Blue Center"

STEEL WIRE ROPE



Mr. Contractor, WE'VE GOT WHAT YOU NEED



- 1: YOUR GOVERNMENT HAS URGENT USE FOR ALL IDLE CONSTRUCTION EQUIPMENT. WE WILL BUY, RE-SELL OR REBUILD YOUR WORTHWHILE IDLE MACHINES.
- TRAINED EQUIPMENT MECHANICS, with factory shop facilities, and a full stock of repair parts.
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MARYLAND

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Hedge & Mattheis Co.

MICHIGAN

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DETROIT, Schuster Equipment Co.
GRAND RAPIDS, Keller Tractor & Equip. Co.

MINNESOTA

DULUTH, Standard Salt & Cement Co.
MINNEAPOLIS, Minneapolis Equipment Co.

MISSISSIPPI

JACKSON, Choctaw Culvert & Mach. Co.

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NEBRASKA

NEW HAMPSHIRE

CONCORD, Hedge & Mattheis Company

NEW IERSEY

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Rupp Equip. Co.
Jaeger-Lembo
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Jaeger-Lembo
Machine Corp.
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CINCINNATI,
CLEVELAND,
DAYTON,
GALLIPOLIS,
HAMILTON,
TOLEDO,
YOUNGSTOWN,
SARDON Hardware & Supply Company
Figley Company, The W. K.
Highway Equipment Company
Pattison Supply Co., The W. M.
Flack Equipment Company
Bischoff, R. E.
Miami Equip. & Supply Co.
Flack Equipment Company
Stambaugh-Thompson Co.

OKLAHOMA

OKLAHOMA CITY, Wylie-Stewart Mach. Co.

OREGON

PORTLAND, Nelson Equipment Company

PENNSYLVANIA

ERIE, John F. Steiner
HARRISBURG,
PHILADELPHIA,
PITTSBURGH,
WILKES-BARRE,
Standard Equipment Co.
Standard Equipment Co.

RHODE ISLAND

PROVIDENCE, Hedge & Mattheis Company

SOUTH CAROLINA COLUMBIA, Bell-Lott Road Machinery Co.

TENNESSEE CHATTANOOGA, Osborne Equipment Company
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MEMPHIS,
NASHVILLE,
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SALT LAKE CITY, Jones Equip. Co. The C. H.

VERMONT

BELLOWS FALLS, Hedge & Mattheis Company Strong Hardware Company

VIRGINIA

LYNCHBURG, Branch, Marion S.
NORFOLK, Hampton Roads Tractor & Equip. Co.
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DISTRIBUTORS IN OVER 100 CITIES ARE "GEARED UP" FOR WAR SERVICE



MR. CONTRACTOR: Let a Firestone Tire Specialist Show You the Way to ANY EXTRA HOURS OF SERVICE



For use on driving wheels of earth-moving trucks, truck tractors and semi-trailer units in soft going or fill at moderate smeeds.



ROCK GRIP
EXCAVATOR TIRE
Provides greater traction.
Cut-resisting tread with double

thick sidewalls for greater strength in strip-mining



ALL NON-SKID
EARTH-MOVER TIRE
For scrapers and trailer
wagons. Low inflation pressures
prevent impact breaks and
provide maximum flotation and
traction.

ONSERVATION is the order of the day. Today there is greater emphasis on saving equipment, fuel, and tires. To help you obtain full service from your tire equipment, Firestone offers you the services of a specially-trained tire specialist. He will analyze your earthmover tire equipment and:

- ★ Report on tire abuses that are causing premature wear.
- * Recommend treading and repairing where necessary.

- * Advise on which wheels treaded and repaired tires should be used.
- ★ Examine tires removed from service for additional evidence that may show how to make your tires last longer.
- ★ Will assist your tire service man in setting up a regular routine for earthmover tire maintenance.

Don't delay - act today! Call your nearby Firestone Dealer or Firestone Store and arrange for a complete analysis of the tires on your earth-moving equipment by a Firestone tire specialist.



FOLLOW THE TIRE SAVING SUGGESTIONS IN THIS FREE BOOKLET

Send for this free booklet today. It tells you the proper tire to use on each type of earth-moving machinery and how to avoid the effects of over and under inflation, careless operating practices, mechanical defects and neglect of cuts

estone

AKRON, OHIO . MEMPHIS, TENN. . LOS ANGELES, CALIF.

MORE EARTH MOVING EQUIPMENT IS EQUIPPED WITH FIRESTONE EARTH MOVER TIRES THAN WITH ANY OTHER MAKE WHEN you have a real Rock Shovel you're equipped for the toughest job you have to do and the easy lobs can be handled with greater speed and smoothness. A real can be handled with greater speed and smoothness.

Northwest Rock Shovels have been proved in coast to coast. The Northwest Dual Independent Crowd coast to coast. The Northwest Dual Independent Crowd utilizes force other shovels waste. No welded shovel become of Northwest design and construction has ever failed—of Northwest design and construction has ever failed—of Northwest design and construction has ever failed—of Northwest design and cast alloy steel bases and cast alloy steel nine year record. Cast alloy steel bases and cast alloy steel machinery side frames take the shocks of heavy digging the Cushion Clutch relieves the strain on parts under the Cushion Clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the strain on parts under the cushion clutch relieves the cushion clutch re

In Northwest's ability to keep running unitarity ability to keep running unitarity to keep u

NORTHWEST ENGINEERING COMPANY

NORTHWEST

HAVE A REAL
ROCK SHOVEL
YOU'LL NEVER HAVE
TO WORRY ABOUT
OUTPUT IN DIRT!

HOWAND WHY AMS' TOOLS AID WAR PRODUCT

J. H. WILLIAMS & CO., Drop-Forgings and Drop-Forged Tools, BUFFALO, N. Y.

DATA ON "VULCAN" **CHAIN PIPE TONGS**

There are 6 types of Williams' Tongs, each offering certain advantages for particular classes of work. A knowledge of the features of these various types will enable users to better select the most efficient and economical type for the work at hand.



"VULCAN SUPERIOR": A universal service tong for both pipe and fittings. Has Reversible pipe-and-fittings jaw. Seven sizes, up to 12" capacity.



"VULCAN": The original "VULCAN" Pipe Tong-still the favorite oil-field tongs for general work. Chain swings from center and can be used on either side of the jaw. Eight sizes, up to 18" capacity.



"VULCAN SUPERTONG": Same design as "VULCAN" but forged from alloy and hightensile steel. Provides 50% greater strength than "VULCAN" with no increase in bulk or weight. Eight sizes, up to 18" capacity.



"IMPROVED'VULCAN": Same as "VULCAN" except jaws are double-ended and reversible, providing double service life. Seven sizes, up to 12" capacity.



The "V" recess in "Vulcan Superior" jaws assures quick, positive grip on fittings.

Types of "Vulcan" Chains

While "VULCAN SUPERIOR" and "VULCAN" Tongs are furnished with either Flat Link or Cable Chain, all other types have Flat Link Chain only.

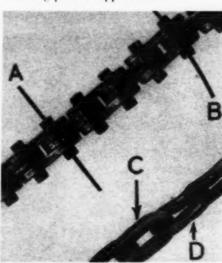
There are three types of Flat Link Chains for Williams' Tongs-"STANDARD","XTRA-STRONG" and "SUPERCHAIN". "Standard" Chains are regularly furnished with all except "Supertongs" but "Xtra-Strong" Chains, providing approximately 40% greater strength, can be supplied at additional cost. "VULCAN SUPERTONGS" are regularly furnished with "Superchains". Every "Vulcan" Chain, regardless of type, is individually proof-tested on a standard tension machine to two-thirds of its break-

Use and Care of Tongs

In using Chain Pipe Tongs the best gripping position is that which is midway of the jaw teeth, or rearward therefrom. The bending of the tong handle under load is not evidence of a defect. Such bending is intended to act as a warning and "safety valve" in advance of breakage of chain, which would incapacitate the tool.

In Flat Link Chains on tongs, an occasional inspection of the first two or three rivets and links adjacent to the swinging, or anchor link should be made, since the load is greatest at that point. Badly bowed, or curved rivets indicate that the chain has been loaded almost to breaking strength and is probably unsafe.

In Cable Link Chains, the links give warning by stretching and pulling "rigid" if the breaking point is approached.

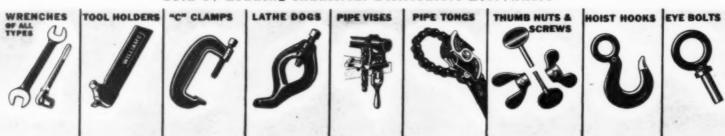


B. Curved or bowed -unsafe

A. Straight rivet indi- C. Safe link indicated by D. Link stretched or pulled "rigid"—unsafe.



Sold by Leading Industrial Distributors Everywhere



DOUBLE MACHINERY LIFE...





From a business standpoint . . . keeping your machinery properly serviced makes it last about twice as long . . . doubles its output before replacement — lowers investment, depreciation, operating cost, increases your profits.

From a patriotic standpoint . . . it releases twice as many machines for our fighting forces . . . sorely needed machines!

It's easy to keep 'em repaired, too! You simply reach for your 'phone, call your dealer and in a short time he'll have your outfit fixed and back to work! In every territory, throughout the continent,

there is an Allis-Chalmers dealer ready to give you quick, expert service and advice. When you have a problem, his knowledge and experience plus yours will quickly solve it. When you have a repair or rebuild job he'll furnish you the highest type mechanical skill, using genuine parts replacements. Dealer service is mighty valuable — use it to your fullest extent. Keep in close touch with your Allis-Chalmers dealer at all times. Let him help you keep 'em going!

times as much critical material when you finally have it fixed — be many times as expensive. Protect your own interest... help the war effort — have your Allis-Chalmers dealer repair, replace, rebuild your outfits now.

Running a machine in need of repairs one

day longer than you should may require 10

TRACTOR DIVISION - MILWAUKEE - U. S. A.

THROW YOUR SCRAP INTO THE FIGHT!



SECOND FRONT STRATEGY needs home front strength. For maintenance of capacity operation and necessary conservation of equipment in the CONSTRUCTION field use

... SINCLAIR PENN-SYLVANIA and OPA-LINE MOTOR OILS.

These oils and Sinclair specialized gear oils and greases give lubricating protection that saves wear and forestalls breakdowns.



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FAIR BUILDING FT. WORTH





Satisfied Customers Assure REPEAT ORDERS

Smith-Mobile Truck Mixer users invariably come back for additional Smith-Mobiles. A typical case is Maxon Construction Company of Dayton, Ohio. Maxon's initial order in April 1941 called for 6 Smith-Mobiles. 6 more were ordered in October 1941 . . . another 6 in January of this year . . . and now they've ordered 40 additional units.

Surely, such figures are significant. The many Smith-Mobile repeat orders come as a result of satisfactory performance. Owners prefer the HIGH DISCHARGE without hoist . . . the CONTROLLED DISCHARGE without segregation . . . the VISI-BLE MIXING feature . . . the successful REAR END CHARG-ING ... the Smith way of introducing water through the feed opening. Above all, they appreciate Smith-Mobile's GREATER SPEED and EFFICIENCY. So play safe! Buy time-tested Smith-Mobiles. Ask for Catalog 198-B.

The T. L. SMITH CO., 2851 N. 32nd St., Milwaukee, Wis., U.S.A.

One of Maxon's 58 Smith Mobiles Used on a Big U.S. Navy War Project.

IMIDO

... and No.

HIGH DISCHARGE Truck Mixer and Agitator

The Whiteman "3-Step" Method MECHANIZES Concrete Slab Finishing

BRIDGES THE MAN-POWER GAP

Here are two low-cost machines which will increase the output of your concrete slab finishing crews at least 40%. These machines are the real answer to labor shortages. With them two men do the work of many and produce better concrete floors, areaways and similar horizontal surfaces.

WHITEMAN job-proved machines mechanize the three steps — 1. SCREEDING, 2. FLOATING, 3. FINISHING—rush vital war construction to completion, release your crews quickly for the next job.

Use the WHITEMAN "3-Step" Precision Method and get your concrete slab finished well ahead of schedule. Wire today for the name of your nearest distributor who will

be glad to put these real job expediters to work for you.

Step 1
SCREEDING

WHITEMAN Rodding Machine has power driven screeds which simultaneously level and compact the mix while pulled forward by one man. Handles 4 co.yd. of low slump mix in 5 minutes.

Step 2
FLOATING

One man operating the WHITEMAN Finishing Machine with "Heavi Duti" rotating trowels covers 1,000 sq. ft. in 15 min.

Step 3

Using the same WHITEMAN finishing Machine converted by changing to "Finish" trowels, the same operator produces a dense hard, long-wearing surface in record time. No hand work and better surface are the results.

Whiteman MANUFACTURING CO.

3249 Casitas Ave.

Los Angeles, California

From mills that roar and screech

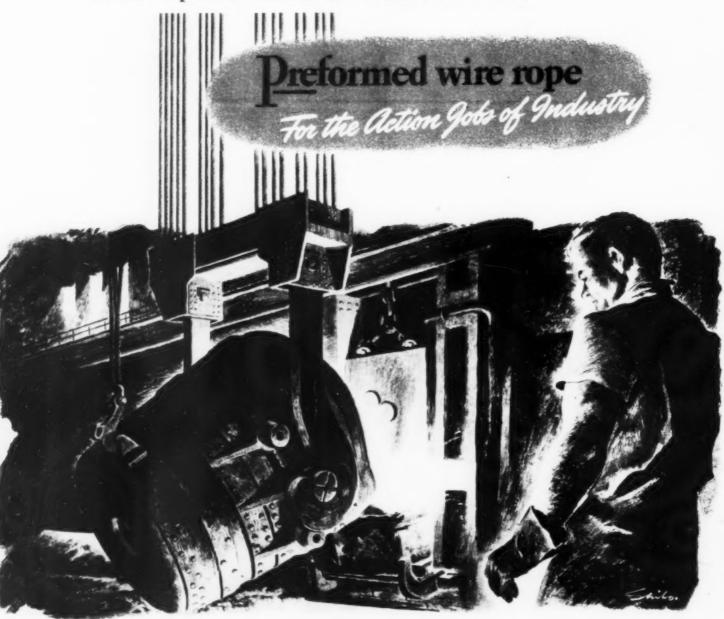
Until peace comes the wire rope mills of America must roar and screech by day and by night.

For without wire rope there would be only a dribble of iron ore, only a thin fleet of ore boats on the Great Lakes, only a starvation flow of steel from the smelters.

The wire rope manufacturers of

America are proud of their ability to produce; proud also that every mill makes <u>Preformed Wire Rope</u> for the hard action jobs. <u>Preformed lasts longer</u>, thereby saving precious time. It is safer, thereby reducing accidents.

But it also saves steel in a time when steel is vital.



ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER



TIRE CLEARANCE — all four tires entirely outside of frame, protected against fouling and damage from wedged rocks, etc. Rear tires come within cutting width of scoop.

This, of course, is only part of the story — but it's an example of the thorough engineering which has lifted Heil Cable Scoops head and shoulders above the field. • When you check over all the Heil features, point by point, Heil performance records on high-speed war projects take on new meaning. You know they make sense, because you understand why. • Then ask the operator. He tells you, "It's a honey to handle — fast-loading, with the blade angle just right." • Use Heil dirt-moving equipment whenever available. Write for bulletins giving details of Heil's advanced design.

HEIL ANSWERS

UNCLE SAM'S CALL

Ond helps the

and of Democracy

Arsenal of Democracy

Arsenal materials for
supply Victory!

THE FIL CO.

GENERAL OFFICES: MILWAUKEE, WISCONSIN



OWNER: International Business Machines Corp GENERAL CONTRACTOR: Vincent J. Smith

CHIEF ENGINEER: Leigh St. John, IBM Corp.
CONCRETE CONSTRUCTION: Serafini Construction Co.

From machines for peace-time business to machines for the business of war! Mr. Thomas J. Watson, President of International Business Machines Corporation, has dedicated the energies of his organization to making munitions for Uncle Sam. Naturally, the sooner a factory is finished, the sooner the munitions will be used against the foe.

Speed was all important here. And one factor in the speed achieved was Lehigh Early Strength Cement. By its use a construction schedule was maintained that would have been out of the question with normal cement.

For instance: Pipe tunnels and retaining walls were back-

filled in 24 hours . . . floor slabs were ready for the steelerecting equipment a week after pouring.. . . 2nd, 3rd and 4th floors were poured within a week instead of a month . . . forms were stripped from face of building in 5 days instead of 21.

In war, speed is a top-flight factor; and Lehigh's Early Strength Cement makes substantial contribution to it. But it provides many other advantages, that peace-time construction has found—and will find again—to be decisive. The Lehigh Service-Department is always ready and glad to supply details.

Lehigh

EARLY STRENGTH CEMENT

for service-strength concrete in a hurry

LEHIGH PORTLAND CEMENT COMPANY . ALLENTOWN, PA. . CHICAGO, ILL . SPOKANE, WASH.





MORE for your excavator dollar.

MORE POWER per yard of dipper than on any other excavators. GREATER STRENGTH per pound of weight with tougher construction of rolled alloy steels.

Behind Uncle Sam's war effort, the big P&H Electric Shovels are in there digging where it counts-in the way that counts-swiftly,

EXTRA RIGIDITY with both upper and lower structures welded as single units.

These and other basic P&H advantages are found throughout the entire line of P&H excavators, large and small.

General Offices: 4494 West National Avenue, Milwaukee, Wisconsin



Awarded the Navy "E" for excellence in war production, P&H displays it also as a pledge of future effort.

steadily!



EXCAVATORS - ELECTRIC CRAMES - ARC WELDERS PH NOISTS - WELDING ELECTRODES - MOTORS

ANOTHER AIR-PORT



Yes, another airport for planes of all types—fighters, bombers—and after the Axis is smashed, for civilian planes.

Because this contractor keeps in close touch with his dealers and keeps his tractors and equipment in first class repairs, Uncle Sam will have his airport ready when he wants it.

Cooperation is necessary if we want to make a quick disposal of Schicklegruber. Contractors and equipment owners must cooperate with their dealers. Give your

THE CLEVELAND TRACTOR COMPANY

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CLETRAC CRAWLER TRACTORS

FOR UNCLE SAM'S WAR BIRDS



dealer the facts about your equipment. Give him a chance to protect you by having an ample supply of parts on hand that you may need.

Now, more than ever before, contractors are taking jobs miles away from their headquarters. When you move in on a new job, look up the tractor and equipment dealer—get acquainted with him—give him an inventory of your equipment—his factory trained service men and facilities are at your disposal.

CLEVELAND, OHIO

er

-GASOLINE AND DIESEL

No priorities on

WAR BONDS

Next to stars and stripes, Cletrac is proud to be flying the "T" Minute Man Flag. Over 96% of Cletrac employees are putting over 11% of the payroll into War Bonds.

MOBILITY ... SPEED ... ENDURANCE



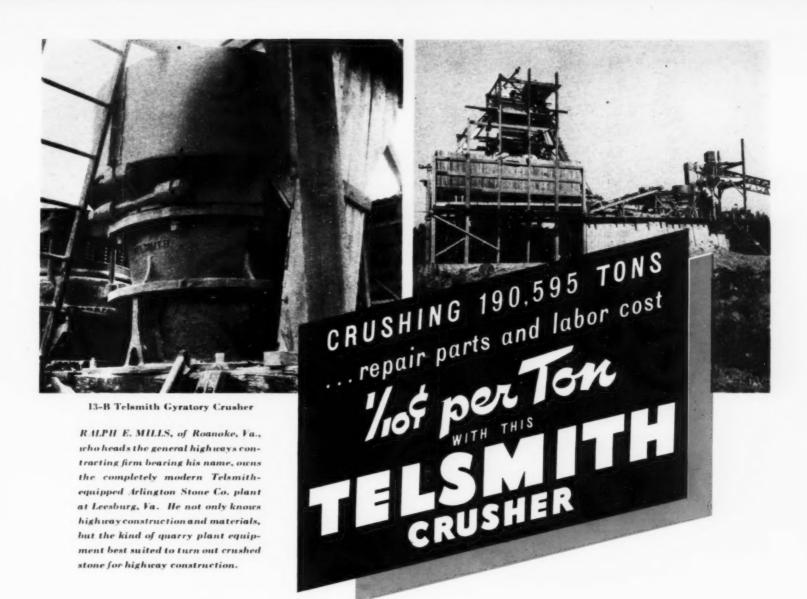
Shipyards throughout the country employ MICHIGAN Mobile CRANES in huge yard-expansion and shipbuilding programs. MICHIGAN mobility, speed and endurance contribute to last erection of war-plants, power lines pipe lines and countless other vital facilities.

These Air-Controlled MICHIGAN Mobile CRANES (3 to 12 ton capacities) may be im-

portant to the success of your future peace time program as well as to your present war-effort. Our engineering staff can offer valuable suggestions and cooperation in helping you solve your problems. Bulletin CM-112 contains complete information. Write for your copy today.

MICHIGAN POWER SHOVEL CO., Benton Harbor, Michigan, U. S. A.

SHOVELS - CRANES - CLAMS DRAGLINES - TRENCH HOES



Has Mr. Ralph E. Mills' choice of Telsmith equipment for his own quarry plant been justified by results? Let's look at the record of the 13-B Telsmith Gyratory Crusher. Used as an intermediate crusher for plus 21/2", it takes the feed from the primary at 80 to 90 tons per hr.

From the start of plant operations, Sept. 1, 1939, to Dec. 31, 1941, this Telsmith Crusher worked 3,941 hours, and crushed 190,595 tons. Repair parts cost \$126.77. Labor charged to crusher maintenance: \$55.73. Total crusher upkeep for 16 months: \$182.50—less than 1/10¢ per ton! And the stone crushed is particularly hard and abrasive.

"Cost of lubricating oil is not included," says Mr. Mason M. Schoolfield, Plant Supt. "The figures do include all manganese costs-because there haven't been any. It is still operating with the original concaves and mantles. We bought two sets of concaves, one standard, the other extra thick to make smaller stone . . tra thick set has operated about four-fifths of the time. Both sets are still in good condition. The largest single item in the above cost figures was not crusher parts at all, but a new set of V-belts. In view of the type stone we are handling here, I think the figures are very remarkable!" You can get results like this in your plant-with Telsmith equipment! Get Bulletin Q-10

SMITH ENGINEERING WORKS, 510 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

Cable Addresses: Sengworks, Milwaukee-Concrete, London

Room 1604—50 East 42nd St. 211 W. Wacker Drive New York City Chicago, Ill. Philadelphia, Pa. 19-21 Charles St. Cambridge, Mass.

Charleston Tractor & Eqpt. Corp. Charleston, W. Va.

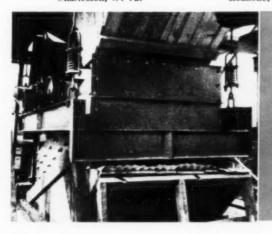
Roanoke Trac. & Eqpt. Co. Roanoke, Va.

Blake Equipment Co. Columbus, Ohio

North Carolina Eqpt. Co.
Raleigh and Stateville, N. C.
Wilson-Weesner-Wilkinson Co.
Knoxville and Nashville, Tenn.

Brandeis M. & S. Co. Louisville, Ky.

G. F. Seeley & Co. Toronto, Ont.



Minus 2 ½" material passing grizz-ly, and discharged from 13-B Telsmith Gyratory Crusher, drops onto 28" x 35' Telsmith Belt Conveyor, is carried to Telsmith No. 7 Belt Elevator with 43" centers and goes up to two 4' x 10' Telsmith Pulsator Screens (left) over stor-age bins. Any one of the five finished products can be re-con-veyed from bins to the Telsmith No. 36 Gyrasphere Crusher (right, with Telsmith Gyratory on ex-treme right) for re-crushing into 3/4", 1/2" or 3/4" chips.





THE ROLLERS...
AFTER

34,000

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Cen

T O PROTECT the wheel bearings of your trucks, tractors, bulldozers, spreaders and other heavy-duty equipment, the lubricant must stay IN THE BEARINGS.

Contractors everywhere are getting thousands of extra hours of service, by lubricating wheel bearings with *Texaco Marfak Heavy Duty*.

As the unretouched photos opposite show, Texaco Marfak Heavy Duty stays on the rollers, protecting against wear and friction despite highest hub temperatures. It stays off truck brake linings in hottest weather, yet lubricates effectively in coldest winter. Doesn't need changing for seasonal reasons.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

.These Texaco users enjoy many benefits that can be yours. A Texaco Automotive Engineer will gladly cooperate... just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.



TEXACO MARFAK HEAVY

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT - CBS * HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

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Only in these LaPlant-Choate "Carrimor" Forced Ejection Cable Operated Scrapers do you get all these features:

No overhead obstructions — correct design and manufacture eliminate the need for overhead bracing so these scrapers can be loaded by shovel and used as hauling units.

Overall height is low—low clearance tunnels and underpasses need not be avoided in transporting from job to job.

Weight distribution equal on all wheels—so tire load limits are not exceeded, and dual rear wheels are unnecessary.

Stability is excellent — the result of correct design stops danger from tipping and jack-knifing.

Rear gate is curved—to make loading and unloading easier.

Apron closing and gate return are positive — as is the forced ejection of material.

Loading resistance is reduced by proper loading angle.

Wheelbase is short — so shorter turning is possible, and tipping danger is still further minimized.

YOU GET MORE AND BETTER WORK AT LOWER COSTS WITH LAPLANT-CHOATE EQUIPMENT





It's Harder to Deliver La PLANT-CHOATE Equipment Today . .

The armed services are demanding and getting more and more LaPlant-Choate earthmoving equipment despite the fact that production is topping all previous records. Because of this fact, contractors may have difficulty getting delivery of new equipment unless they are working on a depot, cantonment, air base or some other project which has a high rating.

This is the reason that most of you must do the job required with machines that are already in service. While LaPlant-Choate equipment has been built to withstand terrific strains and can be expected to give far more than average service, there comes a time when normal wear necessitates replacement of parts for efficient operation.

The LaPlant-Choate-"Caterpillar" distributor nearest you is equipped to serve you with factory parts and servicemen who make it their business to know how to correct troubles. Your distributor can suggest hints and money saving ideas to make your equipment produce until replacement becomes possible. See him today!

Complete Equipment

EARTHMOVING — Hydraulic and Cable Scrapers, Trailbuilders, Bulldozers, Rippers, Tampers, and Scraper Pushers.

LAND CLEARING - Treedozers, Brushcutters, Root Cutters, Brush Rakes, Stinger Blades, Weed Eradicators, Stump Splitters.

SNOW REMOVAL - Tractor Snow Plows.





...with ATHEY Trailer Equipment

Although it's fortunate that bad weather in Russia holds up Mr. Hitler's timetable, we can't permit it to slow down the vast victory program in America.

Up and down our country, in every direction, hundreds of strategic war construction jobs must go forward without even a minute's delay, in spite of unfavorable weather.

Since long before Pearl Harbor, Athey Trailers were proving their dependability as rugged hauling units under the most adverse hauling conditions. Aside from their ability to lick poor footing, they save road building and maintaining outfits because they require no haul roads. Thus, these extra machines can be put to work on other jobs.

Regardless of footing, Athey Trailers get the job done on time — haul heavy, extra-capacity loads through mud, sand or rock without slippage, or wasted time. You can count on them to fulfill your schedule even though weather plays an unexpected trick.

Because of their trustworthiness in any weather, Athey Trailers are at work for the United Nations, carrying materials and supplies to isolated construction operations on distant bases, traveling through uncharted underbrush. They're hauling pipeline, logs, oil-field equipment, reducing risk on many different fronts where dependability is essential. Athey Truss Wheel Company, Chicago, Illinois.

ATHEY

FORGED-TRAK TRAILERS

ROAD TO TOKYO

UP IN the heart of the Northwest wilderness Army Engineers and contractors are making history. Through vast reaches of desolate bush, towering mountains and frozen muskeg, they're pushing an overland road, 1450 miles long. And they're doing it faster than any engineering feat of such size was ever done before.

This is a job for tough men and tough machines, and the Army has them both. Smashing steadily northward, powerful "Caterpillar" Diesel Tractors plow through logs and brush with their bulldozers. Behind them come huge scrapers, pulled by "Caterpillar" Diesel Tractors; and they in their turn are followed by "Caterpillar" Diesel Graders. A great majority of the track-type tractors used by Army Engineers on this project are "Caterpillar" Diesels.

America's purpose is to have not only a great military road for the defense of our northern outposts, but a supply route for bases of attack.

"Caterpillar" Diesel Tractors, Graders, Engines and Electric Sets are furnishing rugged, dependable power to the fighting forces of all the United Nations. They're hauling guns, building airports, clearing jungle trails, powering naval craft, generating current for lights and communication on land and sea,

Here at home, "Caterpillar" dealers have shouldered the responsibility of keeping civilian equipment doing its sturdy share of the war production job. They're supplying parts and service, 24 hours a day, for all the machines that must now carry the load in industry and agriculture. They'll "keep 'em rolling!"

WIN THE WAR: WORK-FIGHT-BUY U. S. WAR BONDS!





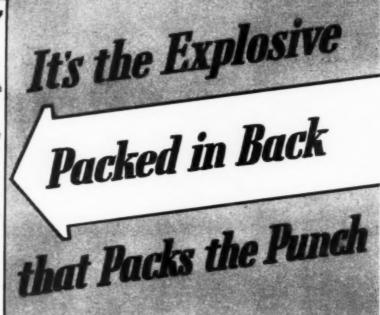
An Atlas "REDI-SLIT" cartridge, as it comes from the case, loaded in the bore hole.



The same "REDI-SLIT" cartridge after tamping.

Atlas "REDI-SLIT" Cartridges

- ... expand easily to fill the bore hole.
- prevent spilling of powder during handling and loading.
- ... maintain the moisture protection of the wrapper.
- ... make modern, economical explosives practical in upward-pitching bore holes.
- ... save money and speed production.



...Your Good Reason for Using

Atlas "REDI-SLIT" Cartridges

Pack the charge into the back of the hole and cut down on bootlegs—with Atlas REDI-SLIT cartridges.

REDI-SLIT cartridges help you get the maximum benefit from your drilling, even with new men on the job. There is no need for tedious hand-slitting—load them just as they come from the case. With REDI-SLIT, no slits are visible; the slits are in the inside wrap of the shell, uniformly and accurately made during manufacture.

Atlas REDI-SLIT cartridges, when firmly tamped, pack neatly, firmly and solidly into the back of the bore hole where the charge does the heavy part of the work. When lightly tamped, they "string-out" the charge better than hand-slit cartridges.

On jobs where solid column loading is required, REDI-SLIT cartridges offer real help and safety. Ask the Atlas Representative to tell you more about them.



ATLAS POWDER COMPANY, Wilmington, Del. · Offices in principal cities · Cable Address-Atpowco

and Delivered to
AIROHITO, ETC.
HIROHITOTITY- and
Without Priority- and
Without Priority Guaranteed!
Fast Delivery Guaranteed!

Yes, sold to Hirohito and his gang—and d... fast delivery guaranteed—even without priority.

Every contractor, county and municipality has obsolete equipment stowed away in hidden by-ways, in forgotten storage, in unused garages—most of it big tonnage stuff that has long since lost its value.

Mister, there never was a better time to get rid of those jalopies. Turn them into scrap now, and let's deliver them to the Axis in the form of bullets and bombs.

- You will be making a major contribution to the war effort by supplying tons of essential steel scrap.
- You will get rid of a lot of old unnecessary stuff and clear the way for the modern and more efficient equipment which manufacturers' research and development will have ready after the war.

How to make your scrap, scrap for you

Get in touch with your nearest Lorain distributor. He will be glad to help you turn your jalopies into bombs and can advise you on any parts of equipment which should be retained for replacement use on other machines.

Then, too, he can help you do more with your present equipment because he has complete facilities for *rebuilding*, *repairing* and *servicing*. For rapid-fire action on today's problems and for the newest developments in shovels, cranes and draglines tomorrow, get acquainted with your Lorain distributor. He's on his toes.



THE THEW SHOVEL COMPANY

THEW-LORAIN

CRANES . SHOVELS
DRAGLINES . MOTO-CRANES





To make the most of your TIRE CERTIFICATES

get the Goodyear that fits your job!

In Rock Work GOODFYEAR HARD ROCK LUG

Tough, massive close-spaced lugs protect the carcass from cutting; provide equal driving power forward or backward; do not hold rock.

In Mud and Marsh GOOD YEAR SURE-GRIP GRADER

Traction provided by deep, wide and evenly spaced driving bars; a self-cleaning, open tread.

 With construction work limited to essential war jobs today, you must have equipment that can stand the gaff of high-speed, high-pressure schedules.

So it's to your own interest to get the sturdiest, hardest-working, longest-wearing tires you can buy.

By the experience of countless users that means Goodyears.

And no wonder! For those three stalwarts pictured above carry the toughest treads ever put on offthe-road tires. What's more, their carcasses are stoutly armored against bruises, and so strong—

In Sand and Soft Dist GOODFYEAR EARTH MOVER

Deep, wide-spaced All-Weather tread provides equal driving power forward or backward; prevents side-slip on grades.

they are best for retreading.

Pick out the one best suited to your needs, and see your Goodyear dealer about it today. Against a future packed with uncertainty, you can't buy better tire insurance!

No matter what kind of tires you have been using, nows the time to change to Goodyears!

GOOD YEAR

All-Wasther - T. M. The Goodyes: Tire & Bubber Company

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN

ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 24

NOVEMBER, 1942

Number 11



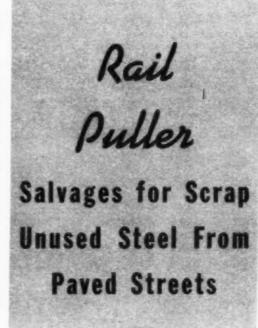
Arme Photo

A PAIR OF HYDRAULIC JACKS operating between the ends of hinged I-beams, like a nut cracker in reverse, are utilized in a machine of special design for pulling out rails from paved streets in New Haven, Conn. With this device, illustrated herewith, it has been possible to salvage rapidly and at low cost unused steel rails urgently needed as scrap for war production.

Approximately 300,000 tons of unused steel rails, according to estimates in an article on salvage appearing elsewhere in this issue, lie embedded in the pavements of cities in the United States. There they serve no useful purpose, as the electric transit lines, of which they constitute the track, have been abandoned. Already many miles of track have been removed, largely by WPA labor, from the streets of Wisconsin's cities, and a large additional mileage of useless railways remains to be reclaimed.

The hydraulic rail-puller, the name by which the machine operated at New Haven is known, employs simple mechanical principles. Built ruggedly to stand much abuse, its essential elements comprise two pairs of I-beams, mounted parallel to each other, and two hydraulic jacks. The lower pair of I-

RAIL-PULLING MACHINE expedites salvage of steel rails buried in asphalt or concrete paving Special rig, requiring only 3 men to operate, is carried on springs at its forward end (in background) and by two-wheel carriage at rear, A clean-edged slot is left when rail is ripped out by pull of hydraulic jack.



beams, spaced to straddle the rail to be pulled, are supported just clear of the pavement surface, to permit travel of the machine, by springs from a motor truck, at the front end, and a two-wheel rubber-tired carriage, at the rear end. These springs are just stiff enough to carry the weight of the Ibeams, which are seated solidly on the pavement surface as soon as the jacks begin to operate. The space between the two lower beams is adjustable so that a minimum width of pavement is broken when a rail is torn out. The upper pair of I-beams is hinged to the lower pair at the front end of the machine and is equipped at the rear end with a pair of hydraulic jacks which exert a pull at the mid-point of the I-beams through a clamp attached to the rail embedded in the pavement.

If embedded in asphalt paving, it is claimed that a mile of rail per day can be torn up by this machine and that it can pull 2,500-lin.ft. per day of rail embedded in concrete — all with the assistance of but three men.

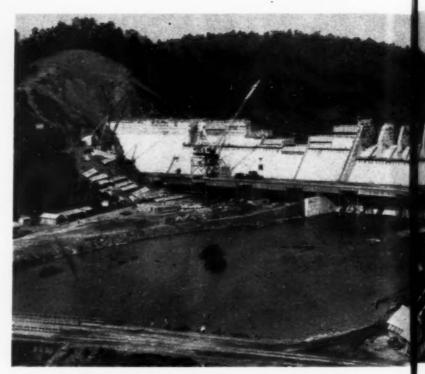
The hydraulic rail puller is the design of Kenneth Allderige, of New Haven, Conn., who has applied for a patent, and was built by the Lebov Iron Works, New Haven, Conn.

DRAFT-TUBE FORMS for powerhouse at Fort Loudoun Dam on Tennessee River are first completely erected in job carpenter shop of Tennessee Valley Authority, then cut into sections and reassembled in place. Outside layer of sheathing is nailed on after forms are in position for pouring of concrete. TVA forces are rushing construction of Fort Loudoun Dam to supply power for war industries.



CHICAGO'S SOUTH DISTRICT WATER FILTRATION PLANT is scene of steel erection for low-lift pumping station being built by Strobel Construction Co. for city's Department of Public Works. For main buildings of plant total of 2,800 tons of steel is required. Project is being constructed under direction of W. W. DeBerard, City engineer of Chicago.

THIS MONTH'S NEWS REEL



APALACHIA DAM, 150-ft. high concrete structure across Hiwassee River, takes form to produce water power for Tennessee Valley Authority. Tunnel 8 mi. long will carry water impounded by dam to penstocks serving turbine generators at powerhouse.

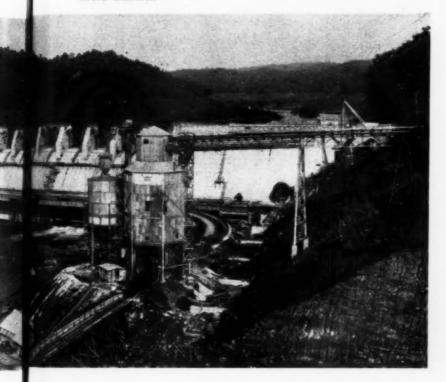
ALASKA HIGHWAY (below) 1,600-mi. military route extending in northwesterly direction from Dawson Creek, B. C., just north of Edmonton, to Whitehorse in Yukon Territory and thence to Fairbanks, Alaska, will have well graded and drained pioneer road available for military truck use Dec. 1, months ahead of schedule. Project under joint administration of U. S. Army Engineers and Public Roads Administration of Federal Works Agency has required extensive clearing of heavy growths of timber (left) for right-of-way before drainage and grading of roadway (right) could be completed. More pictures of Alcan Highway appear in an article elsewhere in this issue.







WAR INDUSTRIES INSPECTION TOUR of President Franklin D. Roosevelt includes visit to Milwaukee plant of Allis-Chalmers Manufacturing Co., whose peacetime products find many uses in construction industry. In presidential party are (left to right): WALTER GEIST, president of Allis-Chalmers; THE PRESIDENT; LIEUT. GEN. BREHON B. SOMERVELL, chief of Army's Services of Supply; and MAX BABB, Allis-Chalmers board chairman.





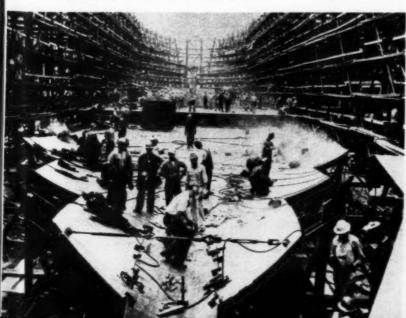
TACOMA NARROWS BRIDGE, wrecked by oscillations set up by wind pressure in November, 1940, provides homeward path along suspension cable 300 ft. high for workers salvaging metal of structure for use as steel scrap Towers will provide 4,500 tons and cables 3,000 tons for scrap drive



WOMEN FOR HIGHWAY MAINTENANCE are being used successfully by Oregon State Highway Department, as recounted elsewhere in this issue by R. H. Baldock, chief engineer. Flagman Barbara Booth diverts traffic around patching job.

ONLY TEN DAYS, new speed record, elapsed between keel-laying and launching of 10,500-ton steel cargo ship JOSEPH N. TEAL (below) at West Coast shipyards of Henry J. Kaiser. Workers are shown welding ship's bottom on same day keel was laid. Speedy construction is attained by large-scale prefabrication of ship's parts.

Press Association Photo



SALVAGE WORK PROGRESSES (below) on former \$60,000,000 French Line vessel Normandie, renamed the U.S.S. Lalayette, which was severely damaged by fire and overturned at her berth in Hudson River, New York City, Feb. 10. View shows floating equipment of Merritt, Chapman & Scott Corp. at work on huge hull.

Press Association Photo



Construction-Builder of Bases

America's Great Peacetime Industry Goes to War =

Punched through 1,600 miles of trackless wilderness and rivaling the Panama Canal in strategic importance, the Alaska Highway will cut days and dangers from present supply routes . . . to Alaska . . . to the Aleutians . . . yes, to Japan itself!

This job, to be finished soon and well ahead of schedule, is but one example in thousands illustrating how construction sets the stage for our war effort . . . and why the construction engineer is

vital to victory.

Back of America's busy production lines, expanding shipyards, growing cantonments and far-flung military bases is a series of swiftly executed construction jobs. Important jobs! For the construction industry is a builder of bases. Bases for production—for training—for defense—and for attack.

To conceive and to carry through so tremendous a program in a race against time is typically American. It requires enterprise and the sort of versatility that has been acquired by undertaking every kind of job; from a Boulder Dam to a drydock, from a Pennsylvania Turnpike to a housing project, from a Radio City to a railroad tunnel . . . and taking it in stride. War's demands in the eyes of America's construction men, are simply more of the samefor a grimmer purpose, and under heavier pressure.

The civil engineers who develop the necessary designs, the contractors who execute them and the manufacturers who provide the equipment and materials, are as much a part of this war as are the men who face the enemy. The results of their labors are recorded in mounting production figures, and will be indelibly written in the military annals of this war. Those 60,000 airplanes, 45,000 tanks and 8,000,000 tons of shipping that the President asked for in 1942 will be supplied because—and only because—the construction industry did a Herculean plant-building job first—and fast.

Yes, construction, America's great peacetime industry, has gone all out for war. From a normal 6½ billion dollars in 1938, it got into its war stride last year with a 11½ billion dollar volume. And under the impetus of Pearl Harbor, the 1942 figure now promises to reach the unprecedented total of 15 billion dollars. "If buildings would win the war, Hitler would be licked now", said Lieut. Gen. William S. Knudsen recently. Which emphasizes the further fact that the construction industry was the first to go to war.

The technical and managerial talent that is accomplishing this mammoth job has had to find its strength and resources within itself. No possibility of "conversion" here! Only years of varied construction experience enabled it to tackle and to achieve the manifold tasks that building for war demands.

Take that cornfield, for instance, that Henry Ford picked for his record-breaking bomber plant. The spring mud was soft and deep when contractors moved in last year. They were entering a race against an almost impossible time limit. Before they could even begin on the plant itself, they had to build roads, lay a 4-mile water supply line and install a complete sewerage system with its disposal plant. But such varied jobs—each big in its own right—merely were antecedent to running up the framework and enclosure for the 60-acre factory itself. Or to using road-building methods to pave a floor that was the equivalent of 25 miles of 20-foot wide concrete highway.

It was a race against the approaching winter, and to win it they had to push their \$1,000,000 worth of construction equipment to the limit—day and night. But win they did! It is accomplishments like these that explain how the nation's aviation factory floor space jumped from 18,000,000 to 60,000,000 square feet in the past two years . . . why fortresses and fighter ships are beginning to turn the scales of war in our favor.

"Somewhere in the Southwest" the Army called for a training base. The contractor who answered that call summed up his performance in characteristic fashion: "Beginning without so much as a contour map we had a \$10,000,000 project ready for operation within 90 calendar days, and saved 3½ million dollars of the estimated cost".

At another Army camp a contractor assembled a crew of 20,000 men who put together 1,400 buildings in 125 working days, along with a sewer system, a water-supply and a street layout of which many a fair-sized city might be proud. This job swallowed up 2,000 carloads of lumber, and 26,000 kegs of nails. So perfect was the teamwork, from the general manager down through the hundreds of super-intendents and foremen to the specialized crews, that as many as seventy buildings were erected in one single day.

But versatility and experience are not the only qualities that the construction engineer has in his tool chest. He has ingenuity, and he needed it when steel, copper, zinc and aluminum had to be used for combat equipment, and were denied him. Great hangars, conventionally of structural steel, were turned out with record-breaking timber arch spans. Reinforced concrete factories were designed to require only 3 lb. of steel bars per square foot instead of the customary 5 lb.. Asphalt-impregnated paper was substituted for copper in flashings, cement-asbestos for galvanized steel in duct work. In the face of a materials shortage, he continued to build bases—safely, economically, and on time.

Construction ingenuity, too, is back of the records in Liberty ships, in war housing and a host of other facilities. Indeed, it was the construction industry that stepped forward to assume the bulk of the emergency shipbuilding program, leaving established yards free to handle more specialized Navy work. Naturally, it was easy for civil engineers and contractors to build the shipyards, but building ships was another story. It is a far cry from steel ships to conventional engineering structures, yet, drawing upon their bridge and building experience, the men of construction have turned out ships faster than they were ever built before.

How was this possible? . . . because the con-

struction man sees every job as a new problem, views every precedent as something to be discarded in favor of something better. So instead of assembling the myriad separate pieces of each ship on the ways, he fabricated them into huge built-up sections. These he swung to the ways and welded them into place in a fraction of the time required by old methods.

Again, the demands for wartime housing for workers in industrial areas, at Navy bases, and near Army concentrations, have altered the meaning of "residential construction". The building of individual houses has given way to a form of multiple-unit project that calls for the skilled services of the architect, the civil engineer and the large contracting organization. On one such project, for example, a contractor experienced in large building and bridge construction employed an extensive system of prefabrication and site assembly that made possible the completion of 5,000 houses for war workers within five months.

All these activities, within the United States, parallel the achievements of other industries that serve the men at the front. But construction knows no continental limits. Its men are serving throughout the network of defense bases built in the West Indies, Greenland, and Iceland, and in the offensive bases that are taking form in the jungles and deserts of Africa, the harbors of the Persian Gulf, and the plains and mountains of Australia and Alaska. Already in this war, as in the last one, construction crews, like those at Wake and Guam, have dropped their peacetime tools to fight shoulder to shoulder with their comrades in uniform. Construction follows the flag to the farthest outposts in this global struggle.

But while the construction industry thus serves the special needs of the armed forces, it must look after its job at home. It must keep the highways serviceable, the water supply safe, sanitary facilities adequate. There are home chores that cannot be neglected even in war.

And when we finish our No. 1 task of winning the war, the construction industry will again be called upon to help re-establish peacetime employment and to stimulate the normal industrial activities of the nation. It will raze, redesign and rebuild; it will bring modern sanitation to urban dwellers; it will safeguard fertile areas and cities from disastrous floods; it will improve all forms of transportation; it will design and build the facilities that will be needed to reconvert from war to peace. Its vision, versatility, experience and ingenuity will be as indispensable then as they are vital now.

Today it is building the bases that are needed back of every battle-line. Tomorrow it will build for a new and better era. Today it is laying the foundation for the victories that must be ours. Tomorrow it will lay the foundation for the peace that will follow these victories. In war and in peace the construction industry is the builder, the harnesser of nature's forces.

Mus H. W. haw. N.

President, McGraw-Hill Publishing Company, Inc.

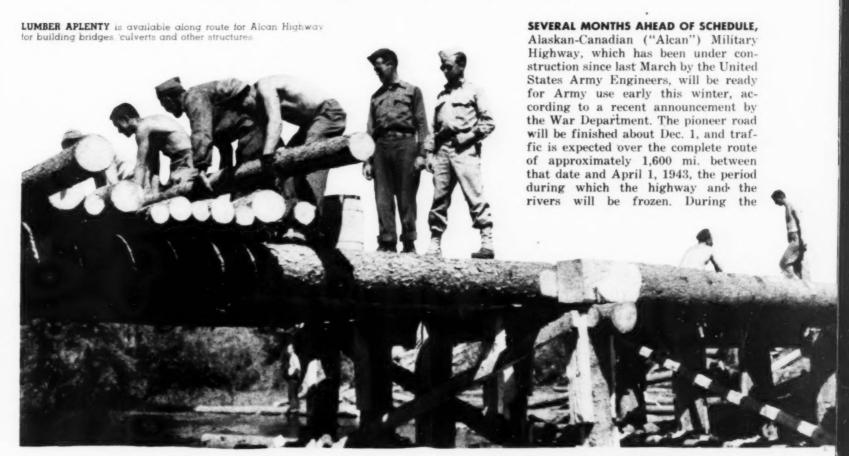
This is the fifth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

Page 42 - CONSTRUCTION METHODS - November 1942



Alaska Highway

WILL BE READY AHEAD OF SCHEDULE FOR ARMY USE THIS WINTER



November 1942 — CONSTRUCTION METHODS — Page 43



COMPLETED PONTON BRIDGE carries earth-laden trucks across Alaskan stream. Bridge floor planking is surfaced with thin layer of earth fill.

months of April and May it is believed the road will be unsuitable for heavy traffic, owing to the break-up of winter.

Although originally contemplated merely as a rough "pioneer" road about 10 ft. wide, to be completed in one year, the Alcan Highway, as it is being constructed by the joint efforts of the Army Engineers and the Public Roads Administration of the Federal Works Agency, will be a well-graded, well-drained truck road for practically its entire length and will afford two-way traffic over many long stretches. The highway begins at Dawson Creek, British Columbia, just north of Edmonton, pursues a northwesterly course to Whitehorse, in Yukon Territory, and thence extends west to Fairbanks, Alaska.

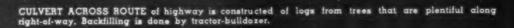
The Alcan Highway will be an important military supply route. Connecting with the existing railway and highway systems at Dawson Creek, the pioneer route provides not only an uninterrupted motor highway to Alaska, but also serves as a feeder road to several important military airfields in Canada that have hitherto had to depend upon air transport for all their supplies.

The construction of the pioneer road was authorized by joint agreement between Canada and the United States and is being carried out under the direction of Major General Eugene Reybold, Chief of Engineers, by engineer officers and enlisted personnel of the United States Army. On Sept. 10, 1942, the War Department announced the establishment

Except where otherwise noted, illustrations are official U.S. Army photos, released for publication in CONSTRUCTION METHODS by the Corps of Engineers.



SURFACING MATERIAL has been applied to provide for all-weather use of section of road constructed through heavily timbered location. Side ditches assure adequate drainage and "turn-outs" enable trucks to park without impeding traffic.





NORTHWEST SERVICE COMMAND, newly established to direct Army highway, railroad-building and supply activities in western Canada and Alaska, has been assigned to COL, JAMES A O'CONNOR, Corps of Engineers, who has established headquarters at Whitehorse, Yukon Territory, Canada, Prior to assuming his new duties Col. O'Connor directed construction of southernend of Alcan Highway.





ka Highway... Continued



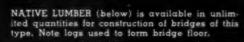
TOPOGRAPHIC SURVEYS along highway route are made with plane table and alidade operated by Engineer personnel.



PICK AND SHOVEL WORK is necessary where mechanical equipment is not available. In background is dense timber stand characteristic of many sections of route.

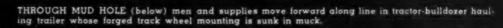


ARMY ENGINEER OFFICER in command of troops which started construction of pioneer road for Alcan Highway last March is BRIG. GEN. WILLIAM M. HOGE.





HAULAGE OF SUPPLIES along pioneer road is done with tractor pulling two trailers mounted on forged track wheels which distribute weight of load over soft, uneven surface of route.









Alaska Highway

Continued

of the Northwest Service Command, in charge of Army highway and railroad building activities, and supply maintenance services in western Canada and Alaska, with headquarters at Whitehorse. Brig. Gen. James A. O'Connor, formerly in charge of construction on the southern sector of the road, has been assigned to head the new service command, with Col. Kenneth B. Bush, Adjutant General's Department, as Chief of Staff.

Complete arrangements have been (Continued on page 96)

PACK TRAIN recalling bygone days of Klondike gold rush moves forward with supplies on muddy route north of Fort St. John.

Except where otherwise noted, illustrations are official U. S. Army photos; released for publication in CONSTRUCTION METHODS by the Corps of Engineers.



SOFT SPOTS along route are corduroyed with trunks of trees cut along right-of-way.



GRADING OF ROADWAY is done with tractorhauled blade machines delivered to job in spite of transportation difficulties.



PLANKS CUT FROM NATIVE TIMBER are employed for cordural construction where bearing power of subgrade is insufficient to carry truck traffic. Workers cover faces with netting as protection against mosquitoes and other insect pests.

LOCAL LUMBER (below) is cut at saw mill set up by Engineer forces and operated from takeoff of tractor.





STREAM IS BRIDGED with ponton equipment of latest type developed by Corps of Engineers. Men are setting steel trestle for shore approach to floating portion of bridge. Permanent structure will be built later.



TRUCK-MOUNTED CRANE handles timber for bridge construction.



NOSE DIVE INTO STICKY CLAY is taken by tractor-bulldozer which is being extricated with aid of cable from motor truck in background.

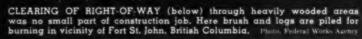


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PREFABRICATED PANELS (above, right) speed construction of wood barracks, store houses, shops and other structures needed at Engineer camps.



GASOLINE STORAGE TANK of 25,000-gal, capacity to serve trucks and other construction equipment has been ferried across Peace River and loaded on trailer for haulage to Fort St. John.





MECHANICAL EQUIPMENT has been delivered to job in spite of unusual transportation difficulties. Here a pair of crawler-mounted Osgood power shovels load trucks in pit.

MODERN EARTH-MOVING EQUIPMENT (below) is speeding construction of Alcan Highway. Here elevating grader loads into truck in vicinity of Fort St. John.

Photo, Federal Works Agency



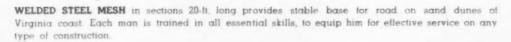




HANDLING OF DYNAMITE (below) is taught by specialists in this dangerous operation. Seabees prepare to blast stump on bad location.











SEABEES ARE INSTRUCTED on simple machine tools to ready them for repairing heavy machinery and to maintain mechanical equipment.

THE TRAINED CONSTRUCTION WORKER who hungers to get in the scrap against the Axis powers will find that his pug-

the Axis powers will find that his pugnacity will be satisfied, his peace-time value raised, and his curiosity about the far places of this globe gratified by joining up with the Seabees — the designation of a new construction corps whose name is formed by phonetic similarity to the initials of the Construction Battalions of the Navy's Bureau of Yards and Docks. Born as a separate and distinct organization to erect needed bases at the four corners of this globe only after the Japs had attacked Pearl Harbor, this corps of men who understand the "hows" of construction in the field are readying themselves to make their bit of history as they build and fight.

Will Work and Fight

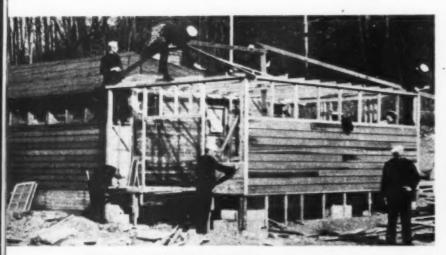
And the Seabees will not only build. They are being taught to fight. At the Naval Construction Training Centers at Norfolk, Va., and Davisville, R. I., they are receiving the military instruction that the untrained but heroic construction workers of Wake Island lacked. At these training centers the finishing touches are given to complete their education not only as construction specialists in definite lines, but also as all round construction men, and as fighters.

Officers of the Seabees all are members of the Navy's Civil Engineer Corps. The battalion will be directed by men who know the principles as well as the practice of construction work. The

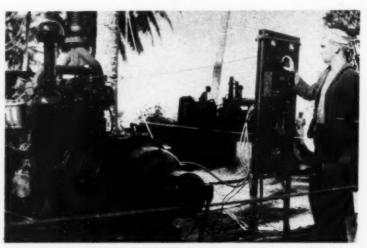




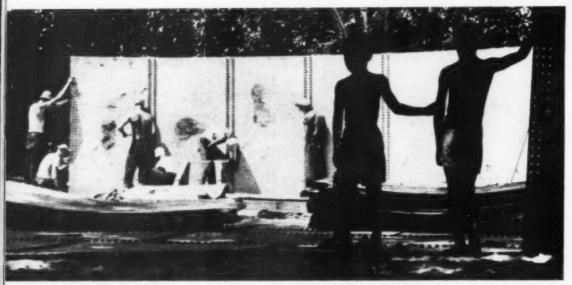
MAR , NO, SEABLES "have landed and have situation well in hand." Men of Naval Construction Battalian take part in practice commando raid.



SEABLES ERECT WOODEN BUILDING at one of training camps as part of instruction in carpentry.

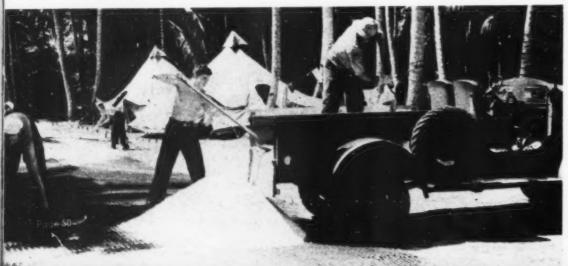


MODERN GENERATOR FURNISHES LIGHT AND POWER. In background, bulldozer cleans terrain for some construction project, where work proceeds on 24-hr. schedule.



STEEL WATER TANK IS ERECTED by Seabees on some far-flung island of Southwest Pacific Naval base. Native curiosity is held by sight of plate assembly operations.

TRUCKS DUMP LOADS (below) of crushed coral on wire mesh to form roads on sands of this South Pacific base.



Official U.S. Navy Photos

process of turning a Seabee "boot" as newly enlisted men are known—into a first-class construction specialist and fighting man is ever in the hands of competent, experienced leaders.

Differing from the practice of the Bureau of Yards and Docks of the first World War, which accomplished its work through foreign manual labor hired at the site, work will be done entirely by the personnel of the Construction Battalions. In place of serving as squad bosses for a gang of men speaking an alien tongue, they will them-selves operate the highly specialized machinery characteristic of modern construction. The intricacies of modern labor-saving equipment are taught them by their officers, or by fellow workers who have demonstrated their ability. They learn what makes a gasengine generator click, how a modern refrigerator operates, and what causes a power shovel to do its stuff. Under the direction of experienced engineers they will come to know the "whys" and "hows" of equipment and its uses.

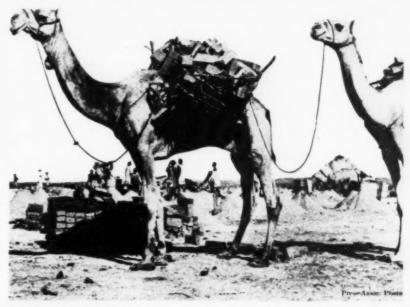
At both Norfolk and Davisville, the new recruit not only learns the rudiments of construction — including the important characteristics of the gear which he will install at advanced bases

(Continued on page 92)





WEB OF STEEL IS WOVEN by construction men of Atkinson-Kier Co., contractors, San Francisco, Calif., to provide reinforcing for concrete spillways at Keswick Dam, U. S. Bureau of Reclamation project in California.



CAMELS TAKE PLACE of modern material-hauling trucks at African air-base building projects. Primitive resources of desert are used to carry brick from kiln to site of work, supervised by Pan American Airways engineers, as stop-gap when up-to-date transportation facilities are lacking.



WADE WAIST-DEEP in tropical seas. Officers and men of Navy construction unit plan runway ramps for seaplanes at South Pacific Island base.



MODERN SKILLS EMPLOY PLYWOOD as alternative for canvas cover of lifeboat on S.S. Herman F. Whiton, coastal freighter. Of exterior (waterproof) type, plywood covers $\frac{3}{6}$ in. thick, installed by ship's carpenter six years ago, have proved longer lived and easier to apply.



NO ONE COULD FAIL to recognize name of Henry J. Kaiser, or to recall that shippards he heads are turning out cargo ships at record-smashing speeds. But how many know that he is largely responsible for first use of dieselpowered units in tractors and construction machinery? As far back as 1929, Kaiser Paving Co., in cooperation with Allis-Chalmers Mfg. Co., Milwaukee, Wis., converted several gasoline-engined tractors to diesel units by installation of Atlas engines.

CHANNELS ARE CUT 12 in wide in concrete along inner and outer rails. Vertical surface of slab along line of longitudinal expansion joint, at left, forms side of outer trench. Concrete is removed to base of both rails. Rail fasteners are then unscrewed, rail lifted out and trenches filled with concrete.

Old Rails Reclaimed

From City Streets
Supply Steel Scrap
For War Program



BY RECLAIMING RAILS from abandoned street railway lines, cities throughout the United States, according to estimates of the American Transit Association and other agencies, can contribute to the war program a total of 300,000 tons of urgently needed steel scrap. The War Production Board, working in some instances with the Work Projects Administration, has directed cities to make available for immediate use as much steel scrap from old rails as possible.

Estimates of the state WPA indicate that 34 cities in Wisconsin have a potential of 14,450 tons of steel rails, and up to July 1 more than 2,000 tons have been salvaged from streets in twelve of these cities. Areas from which rails are removed are filled, in most instances, with plain concrete paving.

The amount of work required to remove unused rail varies considerably. The weight of rail, the type of street



CHIPPING HAMMERS cut trench along inside rail in Milwaukee, Wis.

HEMOVAL OF TRACK-FASTENING BOLTS (left. below) at Milwaukee is simple operation with wrench giving considerable leverage.

RAIL IS PRIED OUT (below) at Green Bay after removal of concrete from 12-in. wide trench.







WIDE TRACK AREAS from which rails have been reclaimed at Sheboygan have been repayed with concrete.



BRICK PAVEMENT is removed from full track zone on single-track line in Kenosha, Wis. Forms are set for repaying with concrete.

paving, as well as the character of the rail joints and track fastening, all play their part in determining the final cost of removal. In the city of Milwaukee, Wis., which had estimated that in its 55,000 lin.ft. of unused double track, 3,225 long tons of steel could be salvaged from concrete-paved streets, the cost of removal per ton of reclaimed rail

was estimated at \$84, a fair portion of which was paid for out of the resale value of the old rails. This value varied considerably, ranging from \$20.75 a ton at the mill using it as scrap for steel making, to \$22.75 a ton at a mill using it as re-rolling material, and \$25.75 a ton if suitable for relaying. Since practically all of the old rails were embedded

in concrete—difficult and costly to break out—the total cost was naturally high. The cost of reclaiming old rail was shared between the Federal Government and the city on the basis of an estimate of the remaining life of the pavement. In the case of new pavements, the city paid but a small por-

(Continued on page 100)

Electric Welding

SAVES REPLACEMENT COST OF NEW DREDGE

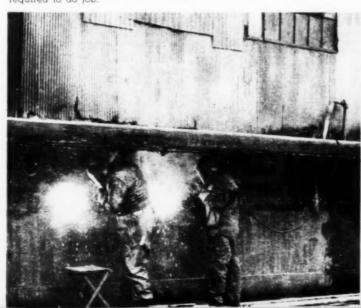
LONG-TIME EXPOSURE TO SEA AIR and salt water so dangerously corroded the waterline plates of a 141-ft. dredge of a large sand and gravel company that serious leakage had developed. This condition indicated the advisability of cutting the water-line plates from the hull and replacing them with new plates. Either a satisfactory repair job or the purchase of a new dredge became necessary. It was decided to attempt the replacement of the corrosion-eaten plates.

The supporting triangular plates for the side runways were first cut from the old plates and suspended from temporary braces. The water-line plates were then cut out, and the new ones, each about 10 ft. long by 27 in. wide, were welded in place, using Westinghouse arc welders. A butt weld, reinforced with a 3 x 5 16-in. strap, was used to join the bottom of the new section to the top of the not seriously damaged plates of the hull. At their tops, the new plates were arc-welded to the steel deck plates.

Originally the dredge was a riveted job, and the use of welding was completely justified by the results obtained, since the reconditioning was done more quickly and at a lower cost than had it been attempted through riveting. Also, considerable dead weight would have been added to the dredge had rivets been used.

It is estimated that 2,800 ft, of welds were required, and that about 1,600 lb. of 5 32-in, and 3 16-in, welding rods were used. The job has relieved the company of buying a new piece of costly equipment, or taking the dredge from service for the length of time that would have been necessary for repair by riveting.

NEW PLATES ARE WELDED (below) in place of plates originally riveted. Westinghouse arc-welding equipment is used to restore service dredge damaged by water-line corrosion at less cost in time and money. About 2,800 ft. of welds and 1,600 lb. of 5.32- and 3.16-in. welding rods were

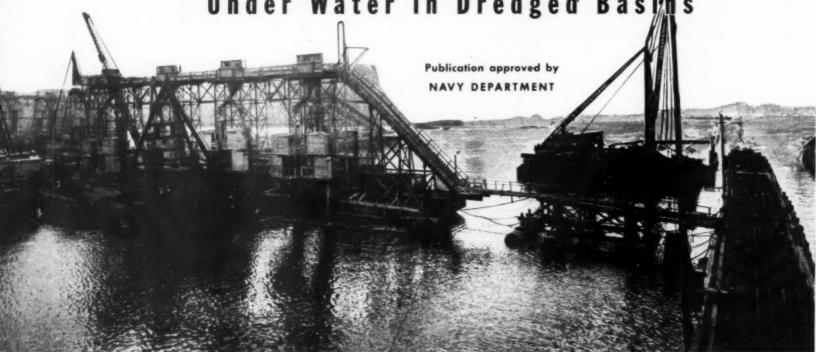


LEAKING HULL OF DREDGE IS RECONDITIONED (below) by arc welding of new plates to replace waterline plates dangerously corroded through long exposure to sea air and salt water. Two workers weld new 10-ft by 27-in. plate to comparatively undamaged submerged hull plates, using 3x5/16-in. strap to reinforce junction.



Two Navy Drydocks

Built of Pumped Concrete Placed Under Water in Dredged Basins



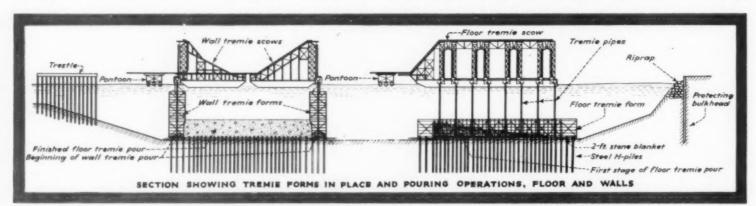
FLOOR TREMIE BARGE equipped with eight tremie pipes suspended from equal number of tower elevator hoppers places concrete delivered to four upper scaffold hoppers by four pipe lines. Barge completes 1,600-yd. floor pour in 8 to 9 hr.

Official U. S. Navy Photos

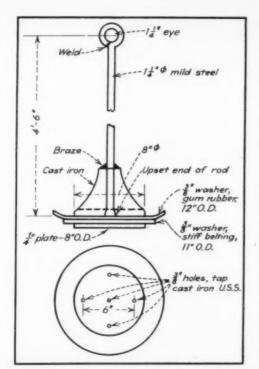
FACED WITH THE PROBLEM of placing tremie concrete at a rate of 350 yd. per hr. in underwater blocks distributed over a gross area of 10 acres in two huge shipbuilding drydocks and an intermediate pump well, contractors for the Navy Department chose concrete pumps and pipelines as the delivery system best assuring the necessary flexibility and continuity of operation. To furnish the required volume of concrete to the pipe lines, the constructors equipped a mixing plant with five 34E dual-drum mixers which fed the remixing hoppers of seven double-chambered 8-in. pumps, later increased to eight pumps. Crowded conditions at the construction site placed a premium on space, and the concrete plant and its material-handling facilities were arranged in a minimum area.

In choosing concrete pumps for delivery of concrete through floating pipe lines to tremie barges, the contractors corroborated the judgment of a number of other firms which recently have built similar Navy drydocks, though under less exacting schedules. On other projects, even where two drydocks were involved, the practice has been to build one dock at a time, as noted in the article by Dan H. Young in Construction Methods, August, 1941, p. 42. For the project here described the contract required simultaneous construction of the two drydocks, doubling the demands on the entire plant. Inclusion of the intermediate pumping well between the two docks introduced some complications and necessitated adjustment of the working procedure to avoid interference during construction.

Lack of space between the two drydocks prevented putting the concrete mixing plant in this central location, and as the best alternative it was set up on a timber-pile pier opposite the mid-point of one of the drydocks and about 100 ft. beyond

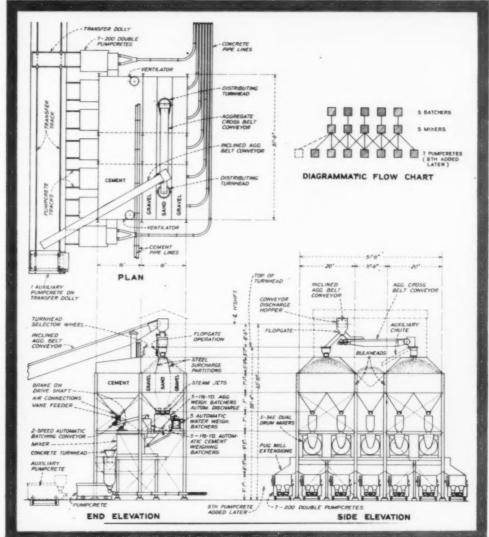


TWIN DRYDOCKS are constructed simultaneously in dredged basin. Tremie barges supplied with pumped concrete by pipe lines pour floor and wall sections inside steel forms, resting on steel bearing piles. Steel foundation piles for drydock protrude 3 ft. into concrete above 2-ft. stone blanket.

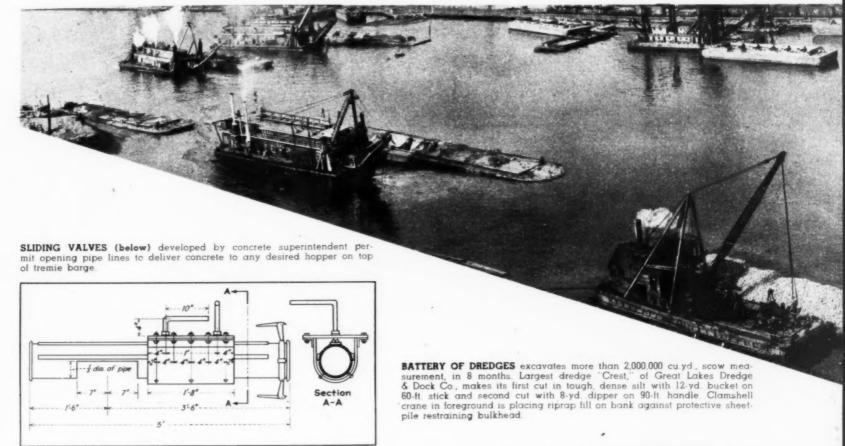


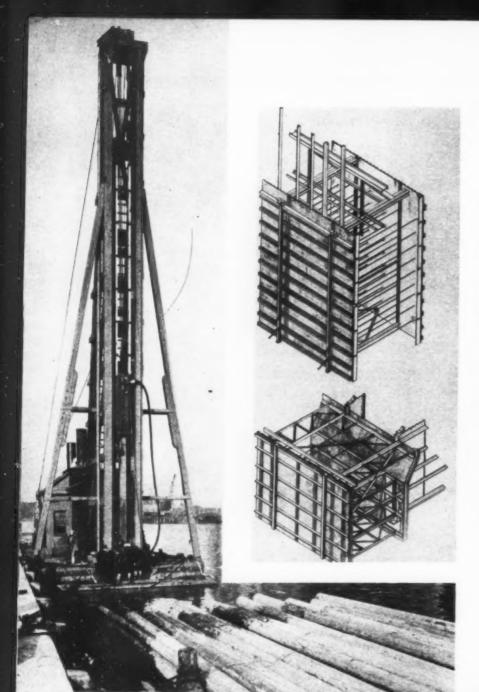
TREMIE PLUG made up of steel and rubber proves effective in making tremie seals and controlling tremie concreting. Plug is suspended by winch cable inside tremie pipe and is recovered after pour is completed. After seal has been established, plug is suspended 12 to 14 in. below bottom of pipe while pour is being made. Because number of these plugs (made of critical materials) were lost in tremie pours, constructors changed to simple canvas and plywood plug described in text.





CONCRETE PLANT capable of maintaining average output of 350 cu.yd per hr. comprises five sets of balchers, five 34E dual-drum mixers and seven concrete pumps, later increased to eight pumps for final 250,000 yd. of tremie concrete. Transverse bulkheads and auxiliary chute are added to overhead aggregate bins to eliminate segregation in center pocket.





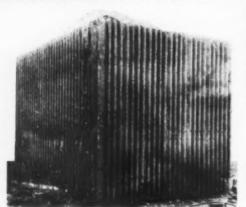
WALL FORM (left) for upper portion of tremie wall is set on lower wall form and fastened by divers with swivel bolts which engage brackets on lower lift. Bottom portion of wall form is fabricated as part of floor form, as indicated in this isometric sketch. After upper portion has been set, entire wall section is concreted in one monolithic tremie operation.

the sidewall. A construction pier to carry the pipelines ran in front of the concrete plant parallel to the drydock. From this pier floating pipelines could take off at any point to supply tremie barges placing concrete in either of the two drydocks.

Booster Pumps—The two drydocks are not parallel, but lie at an angle to each other; the angle narrows toward the outboard ends of the docks. Measured horizontally along the pipe lines from the pumps to the point of tremie placement, the maximum horizontal movement of the concrete was about 1,100 ft. With due allowance for added resistance caused by pipe bends and the vertical rise to elevated hoppers on the tremie barges, the actual pumping effort in the longer lines was equivalent to about 1,600 ft. of straight horizontal pipe. This distance exceeded the capacity of the pumps and required the use of a floating transfer plant equipped with so-called booster pumps which received concrete discharged from the pipes and trans-shipped it to the ends of the lines.

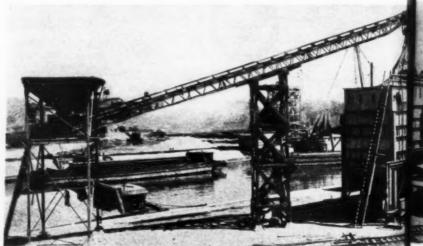
Concreting Schedule — Construction of the two drydocks was carried out in accordance with a schedule which called for laying of the first ship keel behind a temporary cofferdam in one of the docks just 18 months after the first of several dredges started excavating material at the site. The project required more than 2,000,000 cu.yd., scow measurement, of dredging and more than 12,250 steel H-piles driven to support the concrete docks and resist uplift. Tremie concreting

(Continued on page 58)



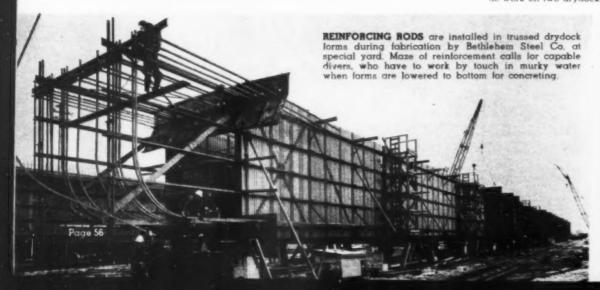
FLOATING PILEDRIVER with telescopic leads drives 12-in. H-pile for drydock. More than 12,000 H-piles 25 to 85 ft. long are driven on 5x7-ft. centers to 37½-ton designed bearing by five piledrivers in 6 months for dock foundations

TREMIE TEST BLOCK NO. 1 (left) reveals good condition of concrete after steel forms have been

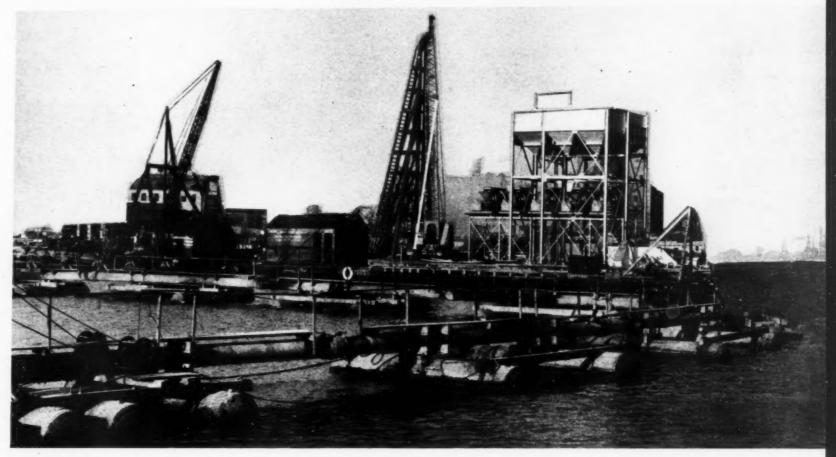


Official U.S. Navy Photos

POWERFUL FLOODLIGHTS (right, below) on pole crossarms illuminate job as work on two drydocks drives ahead 24 hr. a day and 7 days a week



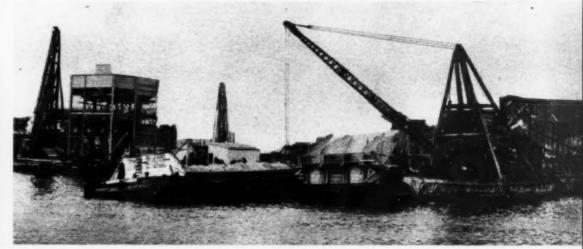




CONCRETE PLANT, from which pipe line extends to tremie barges, is erected on temporary pile trestle. Five 34E dual-drum mixers are already in place.



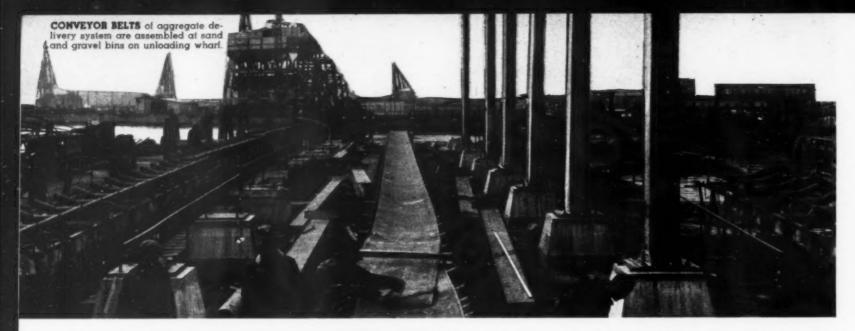
AGGREGATE BINS with capacity of 2,800 yd. on unloading wharf discharge sand and two sizes of gravel on to 36-in. conveyor belt. Each of eight bin compartments has two 16-in. clamshell gates. Concrete plant appears at far right, with inclined conveyor leading up to it from aggregate bins.



 $\begin{tabular}{ll} \textbf{SPREADER BOX} on square-end scow deposits stone blanket, which is struck off to grade later with I-beam drag. \\ \end{tabular}$



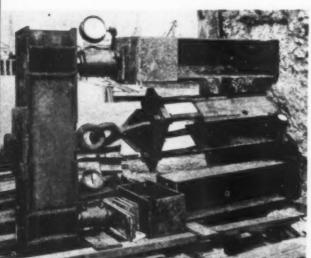




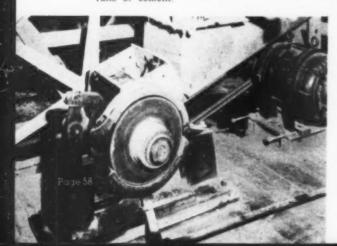


BANK OF CONCRETE PUMPS taking batches from five mixers delivers concrete at steady rate of 350 cu.yd. per hr. through pipelines Battery of seven double-chambered 8-in, pumps is increased to eight for second half of 500,000-yd. tremie job. Reserve unit on transfer car replaces any pump that has to be taken out of service.

Official U.S. Navy Photos



ADAPTED TRUCK BRAKE (below) on flywheel shaft of cement batching conveyor stops overruns of cement.



HAND - OPERATED HY-DRAULIC JACKS (left) apply tension to H-pile embedded in tremie test block to determine bond strength of concrete.

started when piledriving was 65 percent complete, 3 months before the final pile was driven.

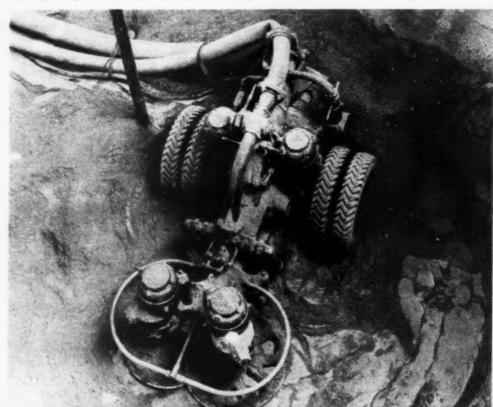
As one of the controlling items in a high-speed working schedule, more than 500,000 cu.yd. of tremie concrete had to be placed in 5½ months. The work went forward unceasingly on a three-shift basis, 24 hr. a day and 7 days a week. In line with the progress schedule, 50,000 yd. was placed in the first month of concreting, leaving some 450,000 yd. to be completed in the remaining 4½ months. On the bare basis of these figures, overall progress had to average 100,000 yd. per month, or more than 3,300 cu.yd. per day.

Maximum capacity of the concrete plant has more than double this required average, providing a necessary margin for time lost in moving floating plant, setting underwater forms, repairing or replacing unserviceable equipment, and overcoming the inevitable difficulties encountered in submarine work. Actual production of the concrete plant for a 24-hr. period from 8 a.m. to 8 a.m. frequently ranged from 5,000 to 5,600 yd., and peak days ran up to 6,300 yd. With the addition of the eighth pump in the concrete plant, following dismantling of the floating booster station, the contractors aimed for 7,000-yd. days and actually attained or surpassed this output on several occasions.

Order of Concreting—Concreting of tremie floor sections, followed by tremie wall sections, started at the inboard end of the two docks and proceeded to the outboard end. Prefabricated steel box forms for the floor sections were so constructed that alternate blocks were concreted first and intermediate blocks, which required the setting of no additional

(Continued on page 104)

CEMENT UNLOADER (below) with rated capacity of 90 tons per hr. is maneuvered in hold of barge by remote control device in hands of operator on deck. Two of these units deliver cement aerated with dry, low-pressure air through pipe conveying line to cement bin at concrete plant.

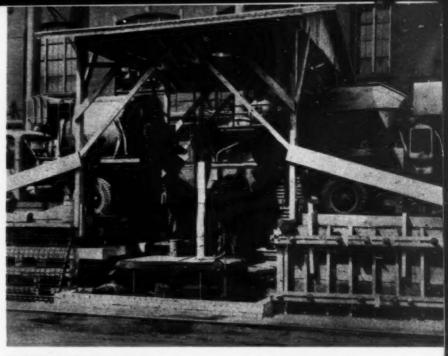


Concrete Base

For Blast Furnace Built by Pumping Concrete to Avoid Traffic Delays in Steel Plant

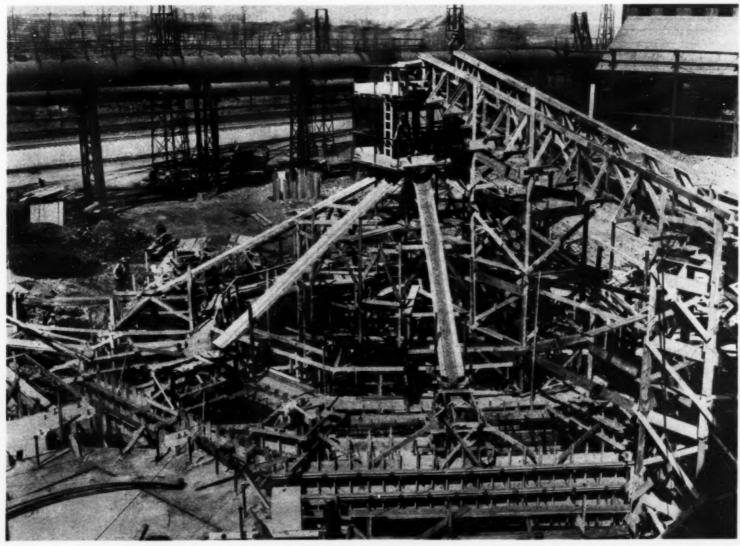
CONCRETE WAS RECENTLY PUMPED TO THE JOB through a 400-ft. pipe line in order to facilitate installation of foundations for a new blast furnace at one of Bethlehem Steel Co.'s plants. Truck-mixers transported the concrete 2 mi. from the mix plant, but the final leg of the route to the site of the new furnace would have been quite complicated by truck, because it would have required crossing the plant's trunk rail line, two sets of tracks for cinder and hot metal cars serving existing blast furnaces and also a main trucking thoroughfare.

In order to speed up concrete deliveries and to avoid periodically tying up other plant traffic—as would have been the case if the concrete had been hauled all the way by truck



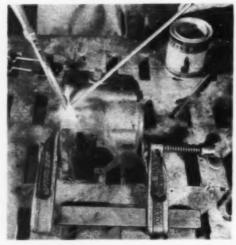
CONCRETE PUMPING UNIT between pair of ramps is charged by truck-mixers and discharges through 7-in. pipe line 400 ft. long.

—two temporary ramps with hopper and pamping unit between them were set up at a point inside the plant that could be reached without interfering with other traffic. From this location a 7-in. pipe line was extended 400 ft. in a direct route to the job, passing under the three plant railways and roadway, and running through one of the plant buildings. A standard 1:2:4 mix with stone aggregate was employed. From the hopper, equipped with an agitator, the concrete (Continued on page 90)



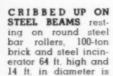
RADIAL CHUTES receive discharge of pipe line carrying pumped concrete and deliver mix to circular base for blast furnace



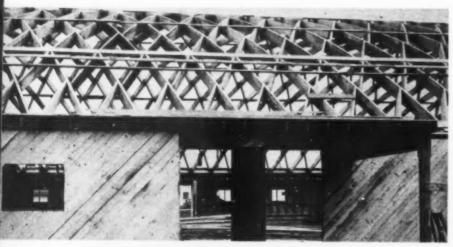


ADJUSTABLE C-CLAMP proves useful device for holding pieces of broken cast-iron motor vehicle transmission housing casting during repair with Oxweld welding blowpipe.

CONSTRUCTION DETAILS Superintendents and Foreme



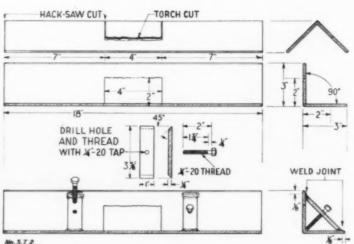
moved distance of 300 ft. by Caterpillar diesel tractor. About 50 tons of fire-brick which line lower part of stack were not removed and served as ballast against wind pressure during moving operation.



ARCHED ROOF OF LAMELLA TYPE provides clear floor area for wood structure built at Army camp on Pacific Coast. Typical of this long-span roof construction is use of 2x12-in. lamella members, spaced about 4½-ft. apart at spring line and assembled with aid of movable scaffold.

Corps of Engli





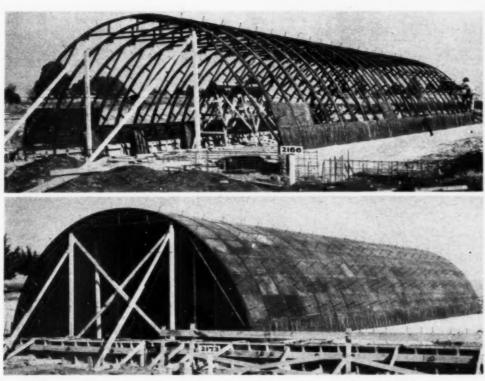
WELDING IIG devised by Walter Williams, of Kerrobert, Canada, holds two pieces of broken shaft in true alignment for repair by welding. With part of 3x18-in. angle-iron forming backbone of jig cut away, operator can weld shaft from all sides, thus preventing warping during welding process, according to "Harvester World." Parts are held in place by 1/4-in. threaded bolts through pair of inclined drilled and tapped strap iron brackets.

PULLING OF STUMPS (below) and removal of debris on large estate damaged by hurricane and flood is done with Yale & Towne Pul-Lift hoist, equipped with ratchet handle, free rolling roller chain and self-actuating load brake.



PREFABRICATED PANEL SECTIONS (below) of wood, assembled at near-by carpenter shop, are used by Army Engineers for building portable barracks at offshore base. Native labor transports units from stockpile to construction site.





FORMS ARE ERECTED preparatory to pouring concrete for "igloo" magazine unit at Army Ordnance plant in South. On steel arch ribs (top photo), supported by concrete foundation walls, steel panels (bottom photo) are placed to serve as inside forms. Projecting from surfaces of inner forms are tiebars for holding outside forms.



SUBMARINE PIPE LINE is made up on temporary platform and is suspended from pile bents by series of Beebe 5-ton hand hoists preparatory to being lowered intact into prepared trench on bottom, saving labor of assembling pipe in place by divers.

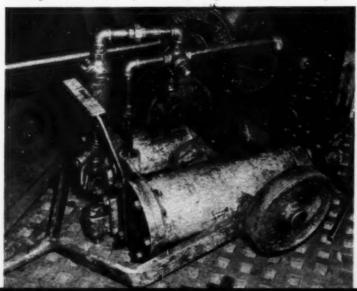


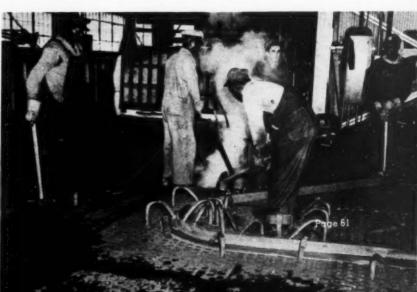
JOINTS MUST FIT PERFECTLY. Machinist with Ingersoll-Rand air operated multi-vane tool equipped with abrasive disk, grinds off edge of plate-steel penstock section for Shasta Dam, U.S. Bureau of Reclamation project in California. Giant pipes, handled in shop on rollers like one at right, are welded together and every weld is tested by X-ray before it is accepted by Bureau of Reclamation. Penstocks are designed to withstand maximum water pressure of 200 lb. per sq. in. when they are in service harnessing power for Central Valley project.



EXCEPTIONAL MANEUVERABILITY is feature of this rig consisting of LeTourneau crane mounted on Athey tracks and operated by Caterpillar tractor. Outlit is moved down sloping river bank to handle steel I-beam for LaCrosse Dredging Co. on Mississippi River at Hastings, Minn.

POWERFUL PNEUMATIC RAM is devised to press steel channels to curved shape required for frames or ribs of steel cargo vessels under construction for U.S. Maritime Commission on Pacific Coast. Channel is curved by wedging one end firmly to bedplate and bending white-hot metal by plunger of ram, pictured at left, mounted on wheels for trundling to any desired position, and held by pin extending into bedplate. Contrasting with this method, is bending of hot channels by hand with sledges, as illustrated at right.







Small Tools on Construction



TAMPING OF EARTH FILL on construction project in West is done with Barco gasoline hammer



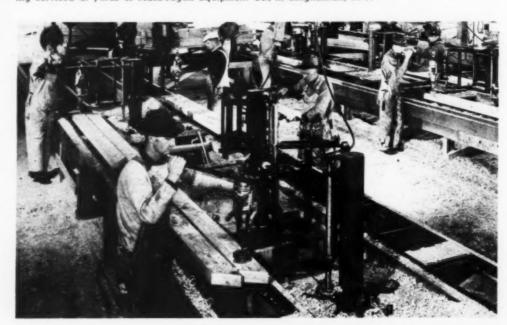
CONCRETE ROAD SURFACE IRREGULARITIES are removed by Berg surfacer which cuts down high spots and uneven expansion joints. Powered by gasoline engine, machine is equipped with cutter plate 7 in. in diameter.

PIPE AND BOLT MACHINE (below) is designed by Beaver Pipe Tools, Inc., as a portable unit for cutting, threading and reaming pipe up to 2-in. diameter.





HIGH-PRESSURE STEAM CLEANING is applied by Homestead "jenny" to construction equipment being serviced at yards of MacDougall Equipment Co., in Binghamton, N. Y.



MASS PRODUCTION METHODS are applied by Timber Structures, Inc., contractor, in assembly yard for building cantonment at Ft. Lewis, Wash. Installation illustrated uses four Black & Decker 4-in. ball-bearing drills both in drill stands and for hand drilling.

SCREEDING OF CONCRETE FLOOR SLABS (below) is done with Whiteman power-operated rodding machine designed to handle low-slump concrete in widths up to 14 ft. Powered by gasoline engine, two screed boards make 5-in. transverse strokes in opposite directions. Steady pull forward by operator provides uniform rate of advance



Women Replace Men
On State Highway Maintenance
Needed for War Effort
In Oregon

By R. H. BALDOCK
Chief Engineer.
Oregon State Highway Department

NEED FOR MAINTAINING highway lines of communication is even greater in time of war than in time of peace. It has been estimated that at least 50 percent of the commodities and services requisite to the war effort of this country move over the highways. The shortage in man power, due to the induction of men into the armed forces, and the unprecedented wages paid for workers in industries make it impossible to find enough male workers to maintain the Oregon state highway system.

About the middle of the present summer operations became so difficult,

(Continued on page 120)



ROAD ROLLER OPERATOR is BARBARA FOSTER who, after training period of four weeks, has become adept in highly specialized job.

FLAG "MAN" (left) who directs traffic past surface patching work in progress is VERNIETA L. DOUGH-ERTY. "More courteous and efficient than men," is tribute paid by Chief Engineer R. H. Baldock.

SEVEN-MAN PATCHING CREW (below) supervised by FOREMAN LEO KERBER (center) includes, left to right: BARBARA BOOTH, flagman; FLORENCE IVERSON, truck driver; OLETA WAGNER, paintman; BARBARA FOSTER, rollerman; VERNIETA DOUGHERTY, flagman; EDITH MCLYMAN, truck driver; and LUCILLE HENNESSEY, truck driver.



AT PAVING PLANT LUCILLE HENNESSEY, standing on running board, has backed her truck to receive a load of bituminous mix.



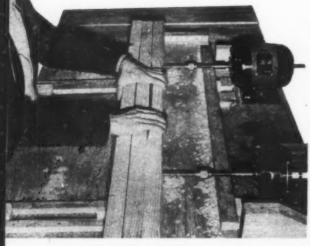
PAINTMAN'S DUTIES are performed by OLETA A. WAGNER (below) who reports for work in coveralls.



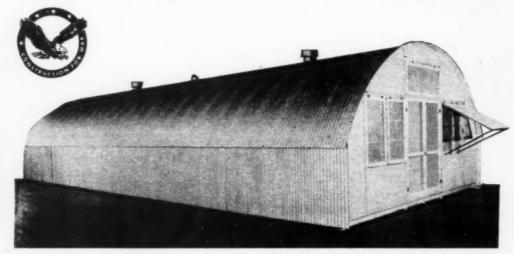
WOMEN TRUCK DRIVERS (below) have been found to be more dependable, more careful and easier to instruct than the general run of male drivers. From left to right in line are OLETA WAGNER, paintman; LEO KERBER, foreman; LUCILE HENNESSEY, FLORENCE IVERSON and EDITH MCLYMAN, truck drivers; and BARBARA FOSTER, rollerman.



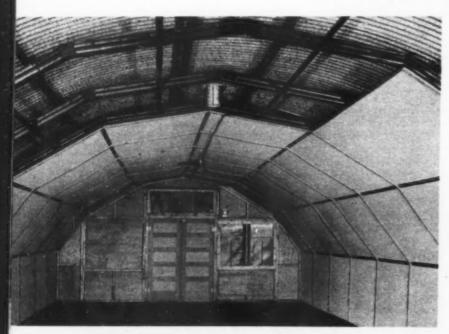
Power Tools SPEED SHOP FABRICATION OF



DUAL POWER DRILLS bore duplicate holes through three wood members simultaneously.

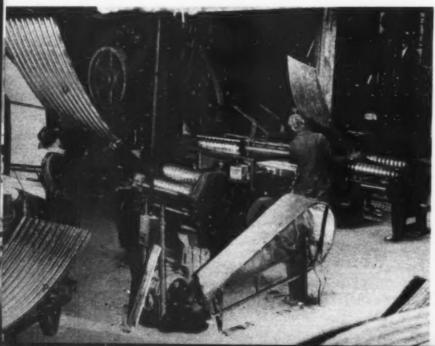


TUNNEL-SHAPED BUILDING with interior dimensions of 20x48 ft., providing housing for 24 men, is made up of factory-labricated parts that can be assembled by inexperienced soldiers in 150 manhours, Windows, doors and transoms in both end bulkheads are fitted with screens for added ventilation in warm weather. Roof carries two metal ventilators and heater flue.



BARREL-ROOF HUT covered with galvanized, corrugated sheet metal on steel frame has interior finished with insulating wallboard and plywood floor panels. End bulkhead consists of plywood-sheathed timber-frame units containing doors and windows. Plywood blackout screen of window at left has been raised to cover sash.

CULVERT ROLLS (below) in factory bend corrugated, galvanized steel roof sheets to 11-ft. 3-in. radius for use on military huts.

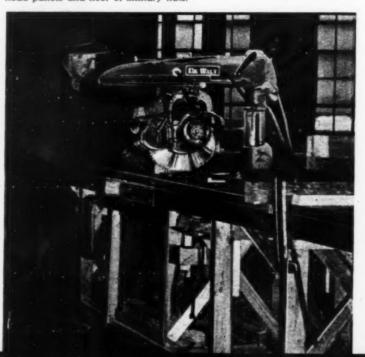


APPLYING TO MASS PRODUCTION for war purposes the same initiative and resourcefulness which had marked their activities in the construction field, two Texas contractors, S. Perry Brown, of the Brown-Lane Co., Beaumont, and Earl E. Jones, of Houston, have taken over an Ohio industrial building formerly used for tire manufacture and have equipped it as a factory with a capacity to turn out prefabricated parts for several score military huts per day. The huts, designed for fire safety, shipment in minimum space and rapid erection wherever troop housing is needed in a hurry, are tunnelshaped, steel-frame structures covered on the outside with galvanized, corrugated sheet steel and finished on the inside with composition board lining and plywood flooring. Parts for a standard-size hut, 20 ft. wide by 48 ft. long, are shipped in 20 numbered crates or packages from which the parts can be removed and assembled into a completed unit by a squad of eight untrained men in a total of 150 man-hr., as demonstrated by field tests.

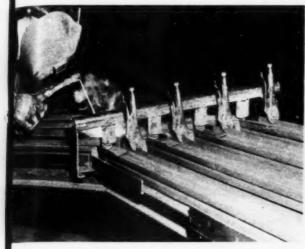
Design of Huts—For the purpose of using standard widths of composition board, plywood and corrugated sheet steel, the military hut is designed in 4-ft. modules, with the steel ribs of the structural skeleton spaced on 4-ft. centers. Buildings may be extended longitudinally in 4-ft. multiples to any length desired, but the standard length is 48 ft. In all buildings, the interior dimensions are 20 ft. wide between vertical

(Continued on page 66)

UNIVERSAL-ADJUSTMENT SAW (below) cuts wood pieces used in bulk-head panels and floor of military huts.



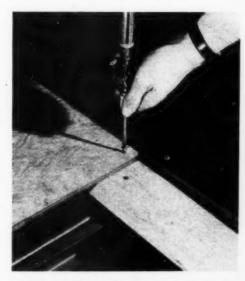
OF Military Huts



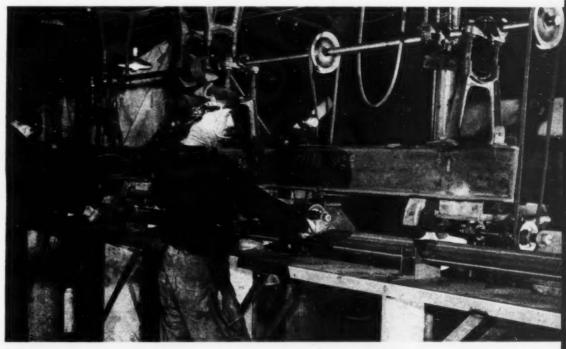
JIG TABLE for four half-rib units holds steel segments in position for hand welding of splice plates at joints. Spring clamps and pincer clamps lock segments of four half-ribs in place on jig table while welders make joint connections.



CURVED ROOF SHEETS shipped in nested bundles are erected on steel frame and fastened to purlins by double-head nails driven into nailing grooves of steel members; lead washer is used under each nailhead. Prefabricated steel ribs, shipped in halves, are joined by bolted angle splice in field.



PLYWOOD FLOOR PANEL is screwed down to 2x4-in. sleeper resting on steel joist which will serve as tie between two lower ends of rib.



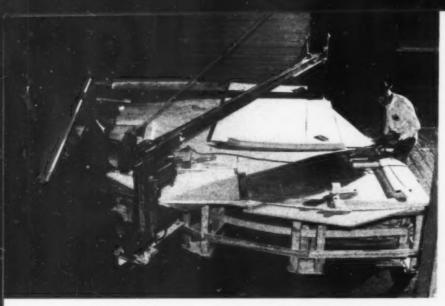
GANG SAW makes four cuts in steel stud to provide segments of proper length for ribs of structural frame.



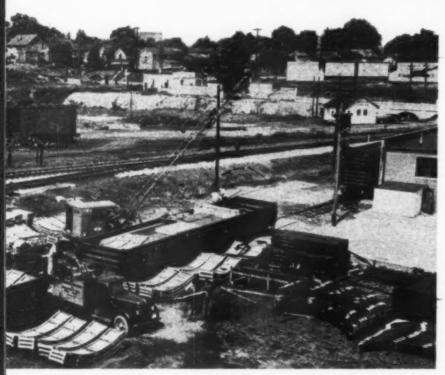
POWER PRESSES (left) cut holes in half-ribs for accurate attachment of purlins, which are fastened with sheet metal self-threading screws.

PLASTIC-COATED WIRE MESH (below) used for window glazing is unrolled and tacked to sash on special bench.

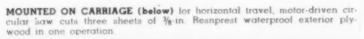


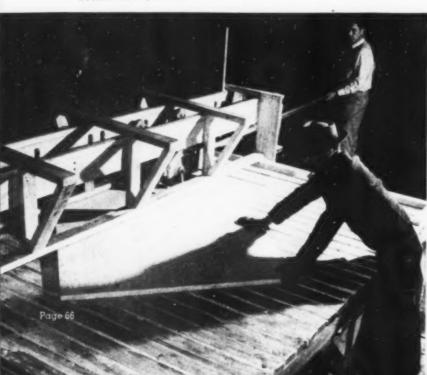


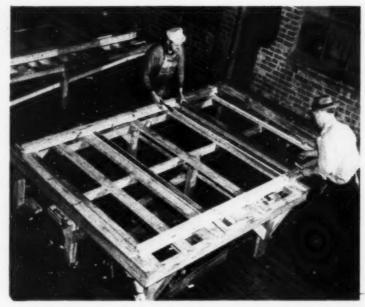
MAKING CIRCULAR CUTS to perfect radius for side panels of end bulk heads, electrically powered band saw supported from radial arm does quick job on three sheets of plywood simultaneously.



COMPACT PACKAGING of nested parts for military huts reduces space required for shipment. Light crawler crane loads parts into gondola car







WOOD FRAME of double door is laid out on jig table as first step in assembly of complete unit on this bench.

walls, 4 ft. high, with a vertical clearance of about 10 ft. from the floor to the crown of the arched ceiling.

Accompanying photographs indicate the steps in assembly and the general appearance of the military huts. All units of the skeleton frame are Stran-Steel members incorporating a nailing groove into which nails may be driven and held securely. Transverse steel sills laid directly on the ground at 4-ft. centers serve as tie-struts between the lower ends of the arch rib units resting on them. Longitudinally the frame is tied together by steel purlins in the roof sections and steel trimmers in the side walls.

No windows or skylights are used in the side walls or roof of the building. As a protection to the occupants against bomb fragments, the structure is designed to permit banking with earth on the outside to the top of the vertical wall. The roof is equipped with two ventilators and a heater flue.

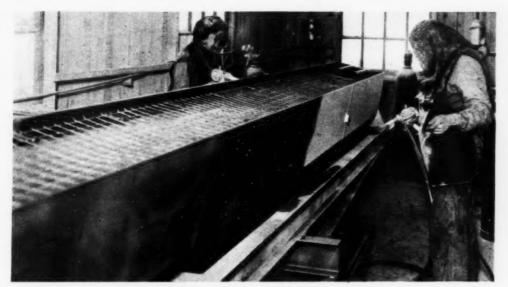
Prefabricated wooden bulkheads closing the two ends of the hut provide doors and windows. Each end bulkhead is shipped in three prefabricated units, one for the double door and two for the side panels containing the windows, as shown by photographs. Instead of glass, plastic-coated wire mesh such as Cel-O-Glass is installed in the sash at the factory.

Siding and roofing of the huts are 26-gage galvanized, corrugated steel sheets; roof sheets are curved to 11-ft. 3 in.

(Continued on page 122)



SHEETMETAL SHOP prelabricates roof flues and ventilators for shipment with other parts of military huts.



METALLIZED ZINC COATING 0.006 in. thick is applied by metal spray guns to grit-blasted steel surfaces of 25-ft. section of movable curb to provide protection against corrosion.

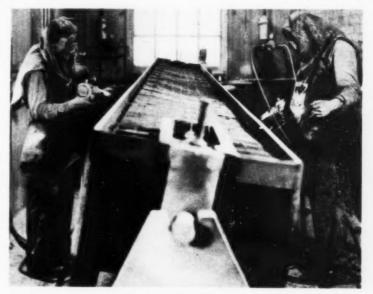
APPLICATION OF CORROSION-RESISTANT

COATINGS is one of the many jobs effectively performed by the metallizing method of spraying atomized, semimolten metal on properly prepared surfaces. An example of this work comes from Chicago, where the Chicago Park District put a metallized 0.006-in.-thick protective zinc coating on grit-blasted steel surfaces of retractible traffic lane curbs installed in the Outer Drive, Jackson Park, along Lake Michigan. Here more than 20,000 lb. of zinc wire was used to apply the thin, metallized coating to the steel surfaces of movable curb sections.

Movable Traffic Dividers—Developed by the Chicago Park District to provide flexible allocation of roadway capacity on its multiple-lane highways, as required by fluctuating volume of inbound

(Continued on page 98)

Metallized Coating PROTECTS STEEL SURFACES OF MOVABLE TRAFFIC SEPARATORS



TRUNNION MOUNTING of 25-ft, curb section in metallizing shop permits work to be rotated as operators sheathed in masks and aprons apply thin zinc coating with hand-held metal spray guns.



RETRACTIBLE CURBS which can be raised and lowered from central control stations provide flexible distribution of roadway capacity for inbound and outbound traffic on multiple-lane highway of Chicago Park District.



FIRST WELD on 550-mi. crude-oil pipeline running from Longview, Tex., to Norris City, Ill. At noon, Aug. 3, welders of Williams Bros. Corp., Tulsa, Okla., lined up and tacked two sections of 24-in-diameter seamless tubing. Line will be completed and in service by Christmas, 1942, according to Petroleum Coordinator Harold L. Ickes.

SEVEN CONTRACTORS BUILD 550-Mile Oil Pipeline



threatening our Eastern states, seven contractors are building a 24-in. seamless steel pipeline, arc-welded throughout, to transport crude oil 550 mi. from Longview, Tex., to Norris City, Ill., with branches to Mount Vernon, Ind., and Enfield, Ill. The Defense Plant Corp. is financing the \$35,000,000 project for War Emergency Pipeline, Inc., an organization of leading oil producers. Pipe is being supplied by the National Tube Co. under a \$7,500,000 contract. This will be the world's largest completely arc-welded crude-oil pipe line.

The first weld on the pipeline was made Aug. 3 near the Texas-Arkansas state line by Williams Bros. Corp., Tulsa, Okla. Within the week a second section was begun by O. E. Dempsey Construction Co., Tulsa, Okla., which is constructing the pipeline from the Texas-Arkansas state line to Gurdon, Ark. The accompanying photographs show the first lengths of pipe on this section of the line being welded under a subcontract by H. C. Price, welding contractor, Bartlesville, Okla. On this and other contract sections Lincoln shieldarc gasoline-engine-driven welders and Fleetwood 5-in. electrodes are being used extensively.

The seven contractors building the 550-mi. emergency
(Continued on page 121)



FINISH WELDING on 24-in, pipe is done with aid of portable gasoline-engine driven machines moved along trench as work progresses.

CHAIN TONGS (below) roll pipe sections to facilitate work of welders on 550-mi, emergency oil pipe line.



SIDE BOOM ON TRACTOR (below) places pipe sections along trench for arc-welding. Abutting ends of pipe are held by clamps.

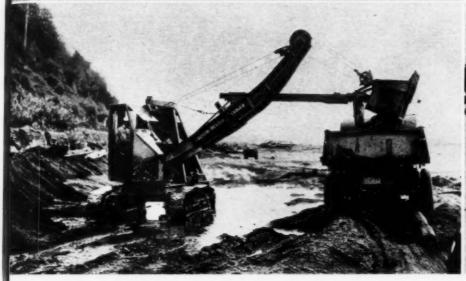


BUILT TO OUTPERFORM

They're Speeding
The Biggest Task
In History

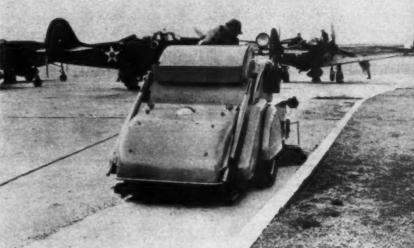


"99-M" POWER GRADERS: Speeding coal and critical metals from mines to mills; constructing and maintaining vital highways; helping to complete airfields, camp sites, ordnance plants, and housing projects ahead of schedule.



BADGER SHOVELS AND DRAGLINES: Meeting the time limit and manpower challenge by fast, consistent performance on airport and war plant construction; loading gravel and keeping materials moving at mines.

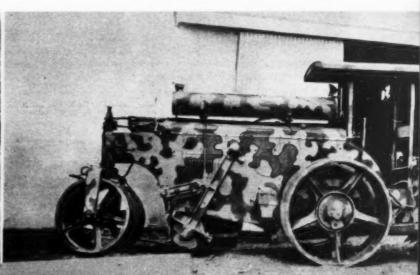
PORTABLE CRUSHING PLANTS: Operating at the job to supply stone, gravel, other materials essential to war construction; eliminating cross hauls, releasing transportation equipment, and conserving rubber.



PATROL SWEEPERS: Hundreds of these nimble, efficient Sweepers are keeping runways and hangars clean and safe. Others are used to conserve time and manpower in and around industrial plants, warehouses and docks.

ROLLERS: Building vital roadways, airfield runways and Army Camp thoroughfares... and turning jungle trails into truck roads to reach new sources of critical war materials.





Austin-Western

THE AUSTIN - WESTERN ROAD MACHINERY CO., Aurora, Illinois Motor Graders • BLADE GRADERS • ELEVATING GRADERS • SCRAPERS • CRUSHING AND SCREENING PLANTS • ROLLERS ROLL - A - PLANES • MOTOR SWEEPERS • SHOVELS AND CRANES • SCARIFIERS • DUMP CARS • TRAIL CARS

Present and Accounted For—A PAGE OF PERSONALITIES



HEAD OF NEWLY CREATED Northwest Service Command, COL. JAMES A. O'CONNOR, Corps of Engineers, U.S. Army, has been placed in charge of all work on new Alcan 1,670 mi. pioneer highway connecting Alaska with highway systems of United States and Canada.



EGYPT HELPED BY AMERICAN CONSTRUCTORS. Arrow points to ROBERT P. BAYARD, general manager of work under contract held by Johnson, Drake & Piper, Inc., Freeport, L. I., who writes to Dwight Winkelman, president, N. Y. State Highway Chapter of A.G.C., "This picture was taken of me and some of our crew near Cairo on one of our rare days off. We have a good gang here and they have to be versatile and ingenious as we encounter every conceivable condition and work."



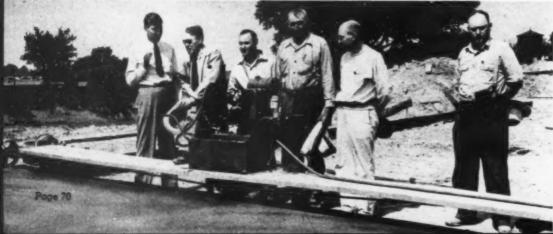
BACKING WAR EFFORT. Group at Boston meeting of Massachusetts and Rhode Island chapters of Associated General Contractors of America, Sept. 16, emphasizes support of war activities of nation. (Left to right) MAJ. W. G. VAN ALLEN, U.S.A.; DAN W. KIMBALL, national president, A.G.C., Grand Rapids, Mich.; H. E. FOREMAN, managing director A.G.C., Washington, D. C., who asserted that private enterprise must do its part in winning war regardless of restrictions; C. M. CALDWELL, War Production Board; and JAMES A. McCONNELL, Federal Works Agency.



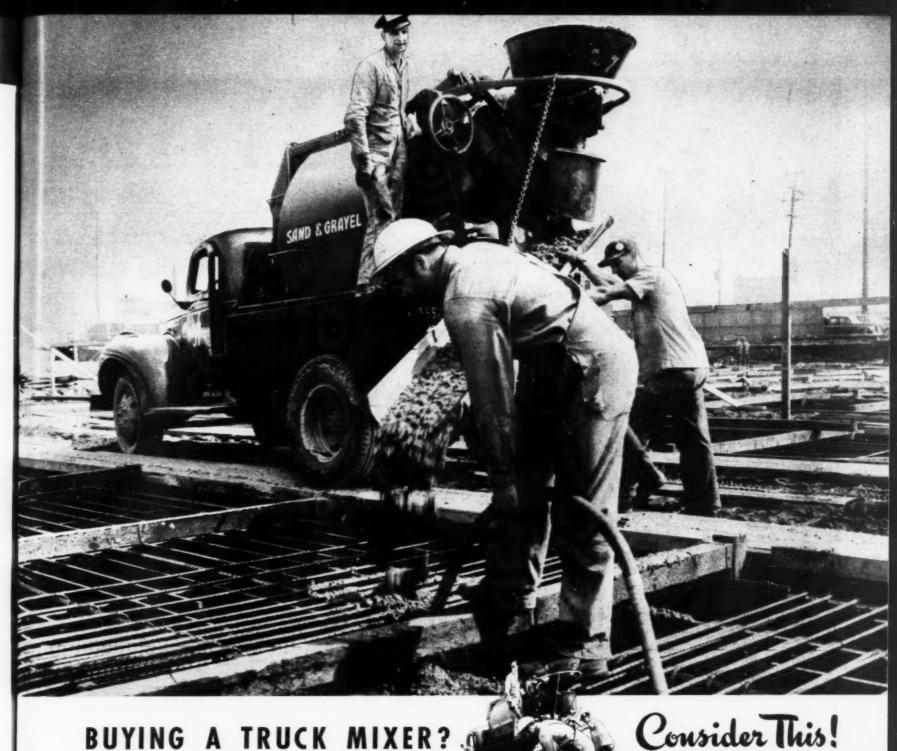


expanded accident-prevention program of National Safety Council is actively directed by NED. H. DEARBORN, new executive vice-president and managing director, whose appointment was recently announced by Col. John Stilwell, Council president Funds for enlarged program, being conducted as result of proclamation by President Roosevelt, are being obtained from commerce and industry by Council's War Production Fund to Conserve Manpower.

NATIONAL COMMITTEE on Civil Protection in War Time, of American Society of Civil Engineers, has new chairman. ERNEST P. GOOD-RICH (below), director of the society, was named to succeed WALTER D. BINGER, resigned because of the pressure of other work, but who will carry on as vice-chairman.







BUYING A TRUCK MIXER

The truck mixer you want is the one that will stay on your payroll a long time—whose design is such that it won't face early obsolescence and inability to compete on a par with other truck mixers of a year or five years from now. We say that such a truck mixer is the Rex Hi-Discharge Moto-Mixer-and offer this as evidence:

WHEN you're buying a truck mixer, remember that Rex is the truck mixer which offers a mixing drum with the only true end-to-end, self-cleaning mixing action. And the Rex mixing drum is proof against "balling" or "dry coring."

Rex is the truck mixer which offers an end-charging design that has been proved, perfected and unchanged during the past two years.

Finally, Rex is the truck mixer which offers a simple, accu-

rate water system—one that is fully protected against freezing!

There are other reasons why you stand to gain by buying Rex-the one high discharge truck mixer that is driven by the shock-absorbing Rex chain belt drive!

You'll find these reasons in the new catalog "Proved Performance from Coast to Coast." For your copy, address Chain Belt Company, 1664 West Bruce Street, Milwaukee, Wisconsin.



MOTO-MIXERS

HI-DISCHARGE AND HORIZONTAL TYPES

COMPANY MILWAUKEE BELT



the Groundwork for VICTORY

We're in this fight 100%—at many American outposts . . . and right here at home—speeding the groundwork for Victory.

Page AUTOMATIC Dragline Buckets are speeding the construction of air fields and bases, fortifications, cantonments . . . yes, and speeding the mining of coal to produce power for the machines turning out planes and tanks and guns.

Why are Page AUTOMATIC Buckets FASTER? Because they are the ONLY dragline buckets built which AUTOMATICALLY land in digging position using ALL their weight to DIG-RIGHT-IN AT ANY DEPTH. That's why Page AUTOMATIC Dragline Buckets have the reputation of outdigging other buckets of equal size and weight.

That's why they're playing such an important part in "Speeding the Groundwork for VICTORY!"

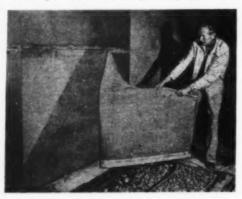
PAGE ENGINEERING COMPANY Chicago, Illinois



CONSTRUCTION EQUIPMENT NEWS

Review of Construction Machinery and Materials for NOVEMBER, 1942

ABSORPTIVE LINING FOR FORMS, known as Hydron, consists of absorptive material faced with labric, which, when in contact with freshly poured concrete, removes water and air bubbles from surface and in said to produce structure of smooth, dense, durable concrete that will last longer and have more pleasing appearance



than that finished by brushing and scraping. This lining is light in weight, readily handled, flexible for application to curved surfaces and is easily applied to concrete forms by stapling. After concrete has been cast, forms are removed and fabric is peeled from concrete. Hydron is now being used on such construction jobs as dams on Tennessee River and Snake River, Idaho; locks at Sault Ste. Marie canal; Norfork Dam, Arkansas, and Keswick Dam on Sacramento River, Calif.—United States Rubber Co. Rockefeller Center, New York City.

REMOTE CONTROL UNIT. standard production feature of all Hobart welders, features dual-control dial which, it is believed, will relieve operators of tendency to "get by" without changing machine adjustment when increased welding heat in desirable in using coated electrodes or in changing from flat to vertical or overhead positions by placing 100 steps of fine volt-amper-



age adjustment within reach. Unit is said to be easily set up by using ordinary lamp cord extension to connect it to machine Protected fully, it is claimed, from accidental breakage by metal

pull-out handle set over control dial and by cushion springs on back of porcelain rheostat. Large outer control dial, shown in photograph, is field rheostat which controls differential compounds while remote control unit adjusts open circuit voltage. One thousand combinations of voltage and current are said to be possible with this multi-range dual-control dial.—Hobart Bros. Co., Troy. Ohio.

QNE-MAN, ONE-ENGINE OPERATED WIDE-GAGE CRANE, latest addition to line of Mobil-cranes, mounted on pneumatic rubber-tired wheels, has all operating functions controlled by air power. Features: Independent travel, independent boom hoist, extra wide chassis, 18 rubber-tired wheels, hydraulic steering and air brakes. Extra width of chassis and use of 18 wheels (12 at rear and 6 at front) are said to make it possible to lift loads up to 30 tons over



side of machine as well as ends and to carry them to desired location. Use of outriggers eliminated. Mobilcrane is steered by use of double-acting hydraulic cylinder attached to front axle in desired direction. Steering action is immediate and positive when pressure in applied. Expanding type, fully inclosed air brakes. Boom available in variable length inserts and is equipped with telescopic backstop which allows boom to be lowered to ground and to be raised to minimum safe working angle. Swing and travel clutches on horizontal reversing shaft in upper body are operated by twin-disk clutch. Other features: self-locking worm and worm wheel for maximum safety; safety brake: streamlined cab. Also available with standard width chassis and twelve wheels for use in close quarters.—The Osgood Co...

BLACKOUT PAINT—To do the job properly and expeditiously, a product of this type must produce complete opacity with one coat. It must be non-reflective to outside light. It must withstand all weather conditions. It must dry quickly. It must be easily applied. It must not damage sash or glass and must show maximum permanency. It must be easily removed. Skyco Blackout is claimed to meet all the above specifications. It can be sprayed or brushed. One gallon covers at least 500 sq. ft., and can be easily removed with a cloth soaked with kerosene or other common solvents.—Skybryte Co., Cleveland, Ohio.



Timber ENGINEERING COMPANY

PORTLAND, OREGON

November 1942 - CONSTRUCTION METHODS - Page 73



Why continue to cut and bow wire rope, weakening the strands, making serious accident possible?

Use the Safety Clip. It can't be put on wrong — inexperienced workers can't cause the dangers of the U-Bolt put on backward. The Safety Clip takes a powerful, all-round Fist-Grip on rope. The four flat bearing surfaces far out-hold the finger-pinching U-Bolt Clip, and cannot crush and crimp wire rope.

The Safety Clip Gives More Steel for Armaments!

25% less steel is used in a Safety Clip assembly equal in strength to a U-Bolt-held rope. That steel can go to arsenals and plane factories for allout military needs. Fewer clips are needed — that saves steel, too. And the rope-ends stay straight and round for re-use — no expensive waste from cut-off crimped-up rope ends.

THESE ARE YOUR SAFETY SAVINGS

No rope crimping or bowing. No special wrench.	rope saved tools saved
Bolts on opposite sides.	_tightening time saved
Can't go on wrong	accidents saved ·
Fewer clips needed	clips saved
	accidents saved
No bent, battered threads	clips saved
95% rope strength del	ivered by test.

Distributed exclusively through Mill Supply Houses

Look for Laughlin Products in Thomas' Register















NEW CRATER FILLER foot accelerator for use with G-E Strikeasy arc welder is designed to provide close auxiliary control of heat required in welding thin material, such as aircraft tubing, to permit tapering off of welding current at end of bead in order to fill crater and to assure full strength at end of weld bead. Unfilled craters are sometimes source of cracks which are harmful to strength



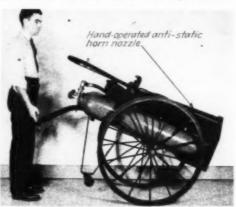
of weld. Claimed to be particularly helpful when working with thin material where normal welding heats are low, where electrode and base material are cold and fusion is poor, where section to be welded becomes thicker or when it is necessary to weld into or across previously deposited bead. In all of these circumstances crater filler is said to give adequate fusion when needed, increased current is instantly available and return to normal heat is instantaneous. When breaking arc, crater filler permits either rapid or slow decrease in current down to point where arc is extinguished, thus helping operator to master technique of finishing bead without crater.—General Electric Co., Schenectady, N. Y.



BLACKOUT BOARD—One West Coast plant recently replaced 47,000 panes of glass with an equal number of panels of Celotex backer board, which were cut to the size of the panes from large size boards before they were taken to the factory. This material is also suitable for screens, baffles and shields, and when reinforced with 1-in. wire mesh affords an additional protection due to the added strength. The board is V_0 in thick and is made of fibrous felt, saturated with a weather-resistant asphalt. The makers recommend this material only where black-out precautions are approved by local civilian defense authorities. Advantages: Affords protection against shattered glass and is said also to protect interiors against damage from wind, rain and snow in the event window glass is broken.—The Celotex Corporation, Chicago, Ill.



100-LB. CARBON DIOXIDE ENGINE. called "Alfite," is recommended for fires in flammable liquids, alcohol storage, electrical machinery and for other Class "B" and "C" fires. Claimed to smother fire instantly with carbon dioxide gas which expands upon discharge to 450



times its stored volume Said to be non-corrosive, non-poisonous and odorless. Equipped with Anti-Statik horn to protect operator from static charge. Designed for perfect balance at wheeling height, has third swivel wheel for easy maneuverability and retaining latch which releases horn instantly, yet holds it firmly in place when not in use—American-La France-Foamite Corp.. Elmira, N. Y.

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WPB ORDERS WELDING

TO CONSERVE STRUCTURAL STEEL

ONE of the provisions of the new ruling of the War Production Board requires the person responsible for the design of a steel building to certify that the new specifications have been complied with, and that "the building has been designed to secure the greatest savings of steel practical through continuity in design and welded fabrication." The new specifications, established September 10th, become mandatory on November 9, 1942, but all agencies are empowered to put them into effect immediately, wherever possible. Emergency specifications complying with the WPB ruling are available at American Institute of Steel Construction, 101 Park Ave., New York, N. Y. (Price 25c).

HERE IS STRUCTURAL WELDING INFORMATION

to guide you in complying with WPB national emergency specifications for design, fabrication and erection of structural steel for buildings.

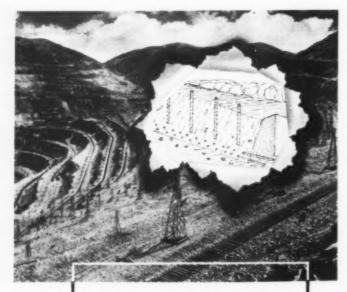
The "Bible" on Arc Welding — New 1308-Page "Procedure Handbook." Contains 282 pages on all phases of structural design—columns, beams, girders, trusses, rigid frames—plus chapters on welding technique, procedures, speeds, costs, testing and application studies. 1810 illustrations. Price \$1.50 postpaid in U.S.; \$2.00 elsewhere. Mail the coupon to Lincoln.

Studies in Structural Arc Welding. Issued periodically. Gives pertinent information on various aspects of structural welded design. Next study discusses anchor attachments to column bases. Free to engineers and designers. Mail the coupon to Lincoln.



THE
LINCOLN ELECTRIC
COMPANY
CLEVELAND, OHIO

MAIL	THE	COUPON	FOR	WELDING	INFORMATION
THE L	INCO	LN ELECTE	SIC CO	MPANY, Dej	ot. CM, Cleveland, O.
of Arc V	Weldir		Practi		Procedure Handbook .S.; \$2.00 elsewhere).
☐ Mail	me fr	ee copy of St	udies in	Structural A	re Welding as issued.
Name					
Position		*			
Company	/				
Address					
City				State	



Kick out the Toe with a Primacord Hookup In cases where well drill holes are not drilled to the full depth of the face, a series of snake holes can be hooked up with Primacord and connected with the main blast so as to "go" at the same time.

Primacord-Bickford Detonating Fuse contains a core of PETN within a flexible, water-proof textile cover. Its flexibility and light weight promote ease of hookup; its powerful detonating wave insures strong detonation of each charge.

Send for the Primacord Book.

THE ENSIGN-BICKFORD COMPANY, SIMSBURY, CONNECTICUT

Manufacturers of Safety Fuse since 1836

PRIMACORD-BICKFORD DETONATING FUSE



There's a vast difference between streamlined stratoplanes soaring above the clouds and sturdy Sterlings wheeling materials . . . yet the two have at least one thing in common . . . they're both helping Uncle Sam win the War. Regiments of dependable, service-proven Sterlings are today performing on vital war projects . . . and they will continue to serve in the reconstruction period ahead.



Page 76 - CONSTRUCTION METHODS - November 1942

ARC WELDING ELECTRODE, designated "Fleet-weld 11," was created for use with "Fleet-Fillet" technique of arc welding and to obtain maximum benefit therefrom. Advantages claimed: (1) Gives deeper penetration of metal into root of joint.



(2) permits up to 100 percent faster fillet welding; (3) allows operator to do more work with less fatigue; (4) decreases welding costs and amount of electrode used per foot of weld. Designed to complete weld in one pass, "Fleetweld 11" is made in 18-in. lengths and two diameters, 3/16 in. and ½ in. and packed in 50-lb. cans.—The Lincoln Electric Co., Cleveland. Ohio.

ALL PURPOSE METAL ETCHER for permanently marking sizes, names, numbers and other important information on parts, tools, dies, punches, chasers, gages, bits, reamers, and like units has following features: (1) Portable, all parts readily inclosed; (2) 14 heats—115 to 1,300 watts; (3) heat indicating lamp; (4) heat-resisting hand piece; heavy asbestos covered



secondary cables; (5) renewable work plate, (6) all steel case; (7) size 8x101/2x7 in. Burns into all smooth surfaced iron, steel and their alloys. Saves time and prevents mistakes in use of materials, parts and tools. Lessens theft and loss. Etcher includes: heavy-duty transformer; 5-oz. special heat-resisting tool or hand piece with heat radiating fins; alloy tip etching point; heavy asbestos secondary cables; 4x7-in, work plate with ground clamp attachment. 115-v., 50-60 cycles standard. Other voltages and frequencies available. Maximum rating 1,300 volt amperes. Weight, 32 lb.—Ideal Commutator Dresser Co., 4102 Park Ave., Sycamore, Ill.

TOUGHOUSE

WATER-TIGHT TRANSMISSION

Hauling rock and dirt through water above the hub caps... that's the work of the Koehring Dumptor on this job. Certainly no easy task, but the Dumptor was not stopped. The oil and dust-tight transmission is also water-tight as proven on this job. High speed production, time-saving operation... today, when production is most important... is an outstanding advantage of Koehring Dumptors. Other advantages are three speeds forward or reverse, easy and fast loading, instantaneous dumping. Every operation saves seconds, increases trips per hour, yardage per shift.

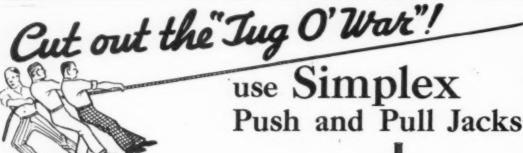
KOEHRING COMPANY



HEAVY-DUTY CONSTRUCTION EQUIPMENT



GEORGE HAISS MFG. CO., INC., 139TH ST. & CANAL PL., NEW YORK



They save manpower and eliminate hazardous makeshifts. Speed straightening and tying of piling and bents, erection of falsework, razing of walls and stacks, tying of forms for pouring concrete, tying of structural members during assembly and tensioning of guy wires. They save time and provide maximum safety on boiler, tank and heavy equipment rigging jobs - one man and a No. 1542 can skid 15-tons. Used with pipe, cable or chain.

or wire for prices, delivery and catalog details

We're at war - no time for tug o' war on construction jobs—check into the advantages of using Simplex Push and Pull Jacks — send for Catalog 41.







TEMPLETON, KENLY & CO. CHICAGO, ILL.

Better, Safer Construction Jacks Since 1899

Page 78 CONSTRUCTION METHODS -- November 1942

FLEXIBLE WIRE ROPE SLINGS, trade name FLEXIBLE WIRE ROPE SLINGS, trade name "Flatweave," has been developed to meet need for light, flexible non-kinking, non-spiralling sling to handle loads more easily. Developed specifically for lifting light and medium loads where legs choke load or sling comes in direct contact with load being lifted. "Flatweave" slings have flat bearing surface which allows even pressure on each of six ropes which comprise sling, thereby prolonging its useful life. Being flat and flexible, they are easily passed through, or under, load. "Flatweave" body is



made up of six separate ropes. Two pairs of two ropes each are laid in opposite directions. These are united into finished sling unit by two These are united into finished sling unit by two single tie ropes which alternately pass back and forth around one pair and then other in spiral figure 8. This method of construction eliminates possibility of any scissors or shearing action between various ropes. Pattern develops high strength efficiency which is equalled by high efficiency of especially constructed loops. Same safe loads can therefore be allowed with loops as with socketed ends. Loops which can be used as chokers without use of thimbles easily slip over crane hooks or lifting lugs. Compact steel sleeves are compressed over all rope ends, permanently securing them. No splices, tucks or servings are present to become dislodged or loosened over sharp corners or in pulling underneath loads.—John A. Roebling's Sons Co., Trenton, N. J.

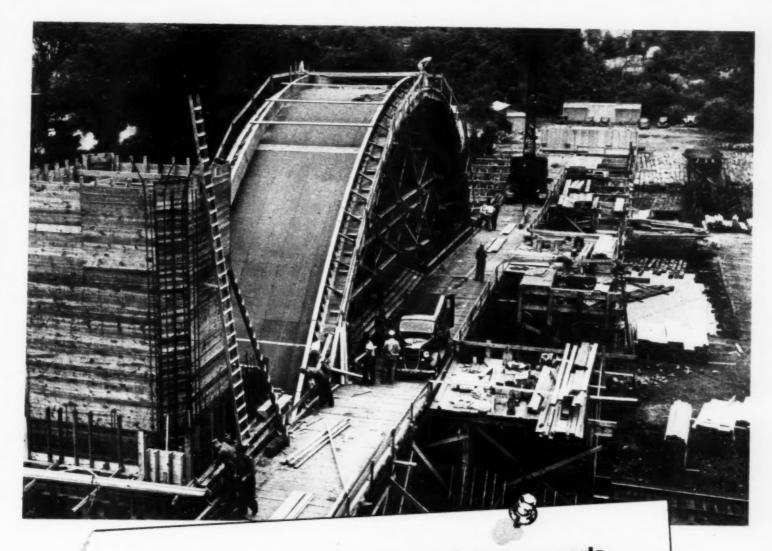
CORRUGATED ASPHALT SIDING, non-critical building material, is designed for use on outside walls of temporary structures, including factory buildings, warehouses, storage machine sheds, or any other structure where corrugated metal might be used. Consists of two layers of heavy rag felt, each saturated in resin-bituminous com-pound and bound together with layer of high-melting-point asphalt and corrugated under high pressure. Product is said to be strong, lightweight, moisture-proof and durable. Corrugations claimed not to flatten out during summer weather, either in storage or after application because of type of in storage of after application because of type of resin used in saturating process. Siding weighs approximately 12 oz. to each sq.ft, and individual sheets are said to be easily handled or applied by one man. Sheets are 28 in. wide and 6, 7, 8, 9 and 10 ft, long. Applied with ordinary roofing nails placed in valleys of corrugations.—Certain-teed Products Corp., 120 S. La Salle St., Chicago, Ill.

PERMANENT TYPE ANTI-FREEZE, known as "No Freeze", is said to contain no critical war materials and therefore to be available in unlimited quantities. Manufacturer guarantees product against freezing down to 35 deg. below zero. Claims that it is not only rust resistant, but that it will prevent rust



from attacking any part of cooling system; that it in harmless to engine car finish or person; it will not boil off that revaporate (boiling point, 324 deg.); and that it will never require testing for antifreeze strength. It is also claimed to contain no acid, calcium chloride, sedium chloride.

ride, sodium chloride or other inorganic salts. Freedom from usual worry concerning anti-freeze strength of "No Freeze" is concerning anti-freeze strength of "No Freeze" is said to be of particular interest to car owners in these days of limited weather reports and commercial operators. Also said to have saved as much as \$200 per season in labor costs by eliminating of twice-daily testing of solution in radiators. Delivered in 1-gal. pails, as illustrated which may be saved for its storage for re-use of the liquid another season.—Great Northern Chemical Co., Inc., Oak Park, Ill.



A speedier job . . . lower maintenance costs with Gulf Lubricants and Fuels in service!

RIGHT at the start of this job, our equipment was checked over by a Gulf engineer, and the story of our benefits from the quality lubricants and fuels he recommended is written in our operating records," says the contractor on this bridge project.* "We have had no time-wasting mechanical delays, and have obtained efficient low-cost performance from every unit."

Here are the chief reasons why so many leading contractors standardize on Gulf products: Gulf lubricants have a well-deserved reputation for stability and toughness — they stand up and give full protection under varied service conditions. And Gulf fuels give top-notch performance. Result: efficient, trouble-free operation of equipment, long service life, and low costs for maintenance.

Make sure your equipment gets the operating benefits of Gulf's higher quality lubricants and fuels. They are quickly available to you through more than 1200 warehouses located in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.



*Frank T. Wescott, North Attleboro, Mass., is the general contractor on this 925-ft. span bridge, which is part of the George Washington Highway by-pass at Providence, Rhode Island. Gulf lubricants and fuels have helped prevent delays and costly repairs.



GULF OIL CORPORATION
GULF REFINING COMPANY
GULF BUILDING PITTSBURGH, PA.



EVERY DRY BEARING IS A POINT FOR THE AXIS.



The overhead frame and lamp fixtures in this illustration were added by the



The Convoy Luber brings pressure lubrication to the job, offers complete facilities for all types of lubrication. Saves time and assures you better lubrication.

GRACO CONVOY LUBERS MEET THE NEED FOR "ON-THE-JOB" LUBRICATION

You save time, reduce costs and do the job perfectly when you use a Graco Convoy Luber for lubricating shovels, tractors, and other heavy equipment in the field. The Convoy Luber's high pressure grease pumps, convenient hose reels, built-in lighting plant, battery charger, and many other modern features makes field lubrication simple, fast and effective. Large production assures you of prompt deliveries. Write for information on how Convoy Lubers are being used successfully on construction jobs all over the world.



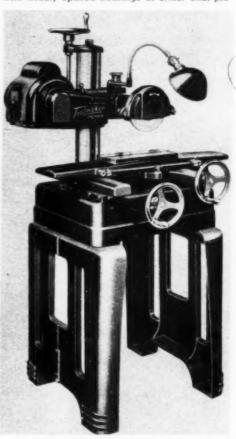
GRAY COMPANY, INC. MANUFACTURERS OF HIGH DUALITY LUBRICATING EQUIPMENT . Minneapolis, Minn.



ALL-SYNTHETIC RUBBER CONVEYOR BELT is believed to be first of its kind made from Buna S synthetic rubber without addition of natural or reclaimed rubber. Buna S is made by chemical combination of butadiene and styrene producing non-oil synthetic rubber which will gradually replace natural product in conveyor and elevator belting, transmission belting, pneumatic tool and welding hose, fire hose, railroad hose, acid and chemical hose and many miscellaneous molded articles.—Hewitt Rubber Corporation, Buffalo, N. Y.

* * *

PORTABLE TOOLMAKER SURFACE GRINDER, said to be versatile and easy to operate, offers following advantages: (1) Wheel-mounting arrangement utilizes two-piece adapter, so that either wheel or wheel and adapter, can be removed. Once wheel is trued up, it can be removed and replaced with adapter and without any further dressing; (2) spindle made extra long with widely spaced bearings at either end, pro-



viding true alignment; (3) improved table with conveniently located control handles; (4) one-piece high-tensile iron column, normalized and accurately ground to close tolerances; entire column, together with bracket, may be rotated 360 deg. Delta Toolmaker Surface Grinder specifications: maximum length that can be ground $13\frac{1}{2}$ in.; maximum width, 6 in.; maximum space under 7-in. wheel to table, $9\frac{1}{2}$ -in.; maximum space under 7-in, wheel to magnetic chuck, 6 in.; table surface, $5\frac{3}{4}$ x13 in.; traverse feed, one graduation is 001; maximum adjustment of wheel by micrometer, $\frac{3}{6}$ in.; each graduation, 0005 in.; minimum diameter cup wheel with standard guard in place, $3\frac{1}{2}$ in.; maximum diameter wheel, 7 in.—Delta Manufacturing Co., Milwaukee, Wis,



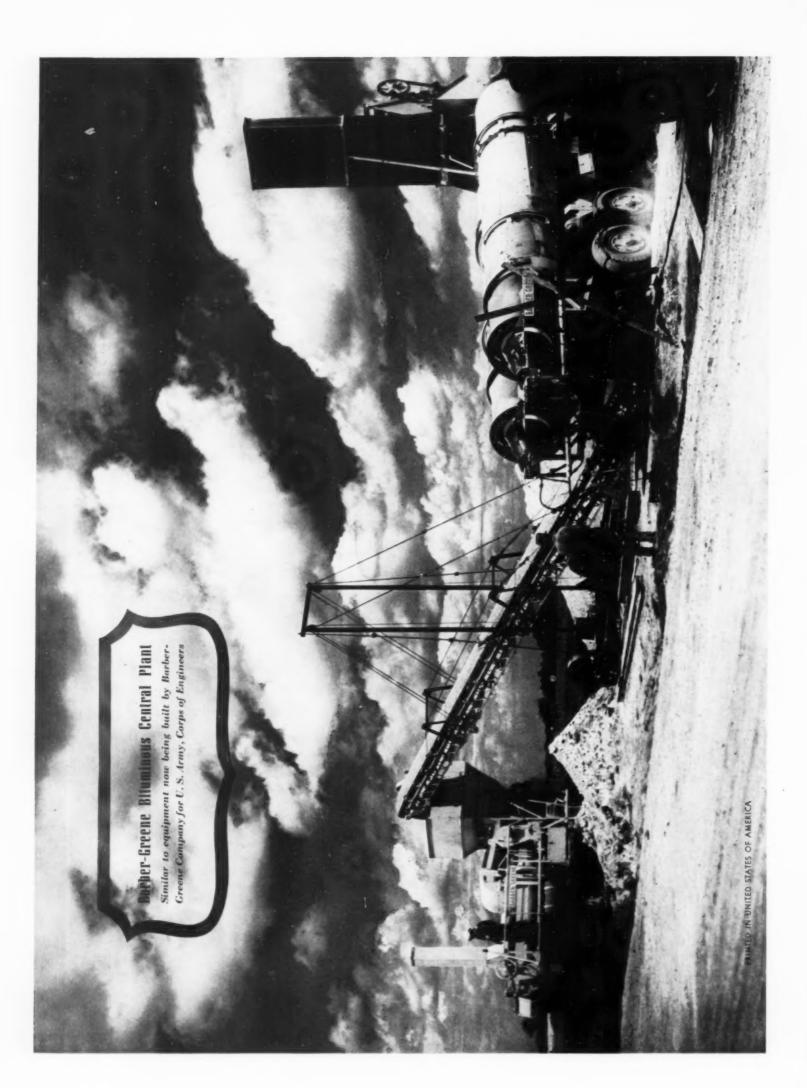
OUR FLAGS

Old Glory—symbol of our democracy—of the freedom it guarantees—of the goal it struggles toward—of ideals it embodies—of sacrifices, by others, for us. * * Our Service Flag—our fellow workers, on the battle front. * * The Minute Man—our share in financial support of their effort. * * The Army-Navy "E"—awarded the employees of Barber-Greene for efficiency in production. * * We are proud that machines developed by us for the enrichment of our peacetime way of life, may now serve so effectively in our country's defense. * * We of Barber-Greene pledge our continued effort to "keep them flying."

BARBER-GREENE COMPANY AUROBA, ILLINOIS, U. S. A.

Buy United States

Har Bonds Stamps



police version of the color of

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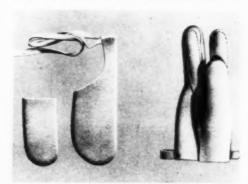
TWO NEW PORTABLE GRINDERS (4 and 5 in.) have been added to Skilsaw line to meet to-day's high speed requirements on all grinding, wire brushing, polishing and buffing operations. Features: (1) Ball-bearings mounted in steel inserts on armature and extreme ends of wheel spindle are said to absorb thrust, eliminate vibration and insure cool operation; (2)



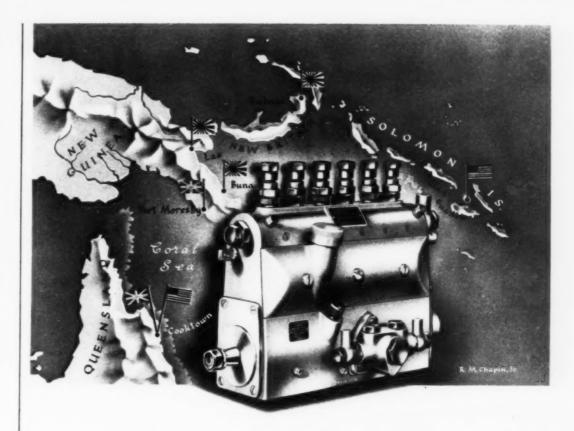
commutator and switch are fully inclosed for protection against dust; (3) straight-line ventilation blows dust away from operator, preventing clogging; (4) steel gears, heat-treated for long life and spline-mounted on shafts are claimed to be strong and quiet; (5) powerful universal motor said to assure full efficiency under load; (6) rubber sleeve handle provides firm, cool, non-slip grip. One model (AD) is 22 in. long, weighs 15 lb., and operates at noload speed of 4,500 rpm; driving grinding wheel $4x\sqrt[3]{4}x\sqrt[3]{2}$ in. Other model (AE) has grinding wheel $5x\sqrt[3]{4}x\sqrt[3]{2}$ in. and operates at 4,200 rpm. Weighs 18 lb. and is $22\sqrt[3]{6}$ in. long.—Skilsaw, Inc., 5045 Elston Ave., Chicago, Ill.

METAL LEAD PRIMER, to replace aluminum paint undercoating, because of its metallic, non-rusting components, is claimed to be the equal in protective value to a good grade of aluminum product. It may be brushed, sprayed or dipped, comes in a neutral grey color, is claimed not to bleed through the finishing coat, and will dry in from 4 to 5 hr. Originally prepared several years ago to meet the special requirements of painted metal displays, such as large neon spectaculars which are exposed to all kinds of weather, it will hold tight to metal under the most severe climatic changes, and will not crack nor flake. This primer can be obtained either in large quantities ready mixed for application, or in cans with the metal paste separate from the vehicle with which it is to be mixed.—Midland Paint and Varnish Company, Cleveland, Ohio.

CHROME LEATHER FINGER COTS to replace makeshift strips of gummed paper, bits of cloth and adhesive tape, are said to be particularly valuable where operators must handle small, rough objects or hot articles not too large in size. Short type at left is recommended for



operations in which only one or two fingers need to be protected or where there is only an intermittent finger hazard Tie-on type (center) is unusually large and can be used as dependable protection for finger and thumb that are bandaged. Tie-on feature makes it applicable to number of uses. Two finger and thumb protector (right) is recommended for operations where several movements require finger protection while succeeding movements require accuracy and sense of touch of bare hand—American Optical Co., Southbridge, Mass.



ON THE JOB

On land and sea American Bosch fuel injection equipment is at work, helping deliver power and even more power when and where most needed to expand America's war might . . . in submarines and other warships, in tanks and other Army equipment, in transportation, and for power plants from Portsmouth to Port Moresby, from Sault Ste. Marie to the Solomons.

Maximum Diesel engine performance demands the highest degree of perfection in the fuel injection system. This in turn requires expert engineering and manufacturing precision measured in millionths. "Beat The Promise" production necessitates instant availability of the widest possible range of equipment types and sizes.

American Bosch experience, engineering service, range of equipment, and production accuracy are daily meeting these requirements. Small wonder, then, that it's American Bosch equipment that's "on the job" where things happen in the United Nations war effort.

American Bosch Corporation • Springfield, Massachusetts

Craftsmen in the New England Tradition





When you hook your tools onto Le Roi Compressors, you have a combination that really clicks . . . the only outfit with engine and compressor built by the same manufacturer. Quickly towed to the job, easily moved about on the job. Practical design and rugged construction for con-

tinuous, economical service. Heavyduty valve-in-head engine insures minimum lost time, lower repair costs. You make a creditable record, with Le Roi's on your jobs.

Write for information describing models currently available.

LE ROI COMPANY . Milwaukee, Wisconsin



EXPERIENCE BUILDS ÉM PERFORMANCE SELLS ÉM

ROGERS BROTHERS CORP. 220 Orchard St., Albion, Pa.



PRE-FINISHED WALL PANELS, called Chevron Board, is plastic-coated wall board available in large wall-size sheets and said to require no on-the-site finishing. Already in use by government for ship construction, war housing and military bases and installations. Panels, avail-



able in sizes up to 4x8 ft., are offered in three designs, tile board, unscored sheets and streamlined, and in wide range of pastel tones. Plastic finish is permanently bonded to compressed wood fiber base at factory and will not warp, chip, crack, craze or peel. Panels are said to be quickly and easily installed, even by untrained workers, by nailing, screwing or cementing to old walls or new framing. Uses, factory conversion, barracks, shower stalls, kitchens, baths, canteens, laboratories and sectional units.—Barclay Manufacturing Co., Inc., 385 Gerard Ave., New York City.

TUBELESS TRUCK TIRE which, it is claimed, will save from 7 to 17 percent of rubber content of casing, tube and flap, has been made possible by change in tire design plus secret mechanical device. Inflated same as ordinary tire. Use of this tire in future will do away with most failures due to inner tube troubles, and make mounting and repairing easier.—B. F. Goodrich Tire Co., Akron, Ohio.

ARC CONTROL STATION, known as "Honey Bee," is an auxiliary electric device connected in the series with welding circuit of any constant potential arc welding generator, and made in capacities of 75 and 150 amp. When two or more units are hooked up to single generator, like number of welding areas can be operated



simultaneously. Each operator can regulate his own current and weld as he wishes without affecting other in any way. Using two 75-amp. arc-control stations, 200-amp. generator can serve two operators instead of one. Arc control station accomplishes: (1) Closer control of welding current; (2) individual remote control of current; (3) current control to assure sound smooth welds at end of each bead; (4) maximum usefulness of each arc-welding generator.—Wilson Welder & Metals Co., 60 E. 42nd St., New York City.



TO KEEP THE BATTLE MACHINES SLUGGING

Harvester Men Form Maintenance Battalion to Serve the Battle Line

FIGHTING MACHINES, like soldiers, suffer battle casualties. Tanks, trucks, tractors and guns immobilized in combat are useless until repaired.

The men who repair the wounded machines in swiftly-moving armored warfare may tip the scale to victory. Maintenance in the wake of battle calls for soldiers who can grind a valve or handle a tough welding job—men with whom mechanics is second nature.

Army Ordnance, in its quest for men to operate its mobile front-line machine shops, came to International Harvester and suggested the formation of a battalion of mechanical specialists from among Harvester's employes and dealers. Harvester tackled the recruiting job and assumed the expense. Within two weeks the enlistment quota was passed. Now this new maintenance battalion is part of another armored division.

From Harvester factories and service stations, and dealers' shops all over the United States, came mechanics skilled in the building and servicing of machines. They volunteered eagerly to go to the front lines to keep the combat equipment on the field of action.

They will serve with the first such battalion formed from the manpower of a single company. Harvester takes the greatest pride in the speed and enthusiasm with which these hundreds of men volunteered; and in the aptitude of the men now in field training, reported to us by the regular Army officers in command. They are worthy comrades of the 5000 Harvester men who preceded them into military service.

American mechanics are the world's best. They come from the factories, shops and service stations of America—free men—builders of a free land. The Army needs 100,000 more of these men, to be enlisted in many similar maintenance units. Their skills are among our greatest assets in keeping the battle machines slugging for Victory.

INTERNATIONAL HARVESTER COMPANY 180 North Michigan Ave., Chicago, Illinois

INTERNATIONAL HARVESTER



Modern Blackhawk Wrenches Lick Tough Jobs On ALL FRONTS

"I'm plenty glad we bought a good lay-out of BLACKHAWK Wrenches. It sure is great the way they take the daily punishment we give 'em. And today they're good as new. That proves there's a lot to those special steels Blackhawks are made of. They're tougher than an army mule. So I know they'll see us through the heavy going of the war years."

You said it, brother. Bring on any kind of wrench job - big, little, simple or ornery - fast, accurate assembly or close-quarter repair and maintenance! Modern BLACKHAWK WRENCHES are built to take 'em as they come. Rugged, speedy, dependable

- slim, trim design for light weight plus exceptional strength — with lots of exclusive features that make 'em the fightin'est tools you ever got your mitts on.

See your Blackhawk Jobber Salesman - or write for free 48-page "HANDY GUIDE," giving helpful wrench data.



NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

CUTTING AND FORMING WROUGHT IRON—A.

M. Byers Co., Pittsburgh, Pa. (4 booklets, illustrated.) The special qualities of wrought iron are widely understood. For certain purposes it is almost universally specified. Nevertheless, its characteristics and peculiarities are not completely realized. To overcome this lack of knowledge, a manufacturer of wrought iron in this country has issued four booklets describing the best ways of Threading Wrought Iron Pipe (24) best ways of Threading Wrought Iron Pipe (24 pp.). Welding and Flame Cutting of Wrought Iron (20 pp.), Bending and Flanging of Wrought Iron Pipe (17 pp.), and Bending Wrought Iron Plates (14 pp.)

PERMISSIBLE LOADING FOR MERCER CRANES Mercer Engineering Works, Inc., New York, N Y. Three slide-rules giving the distance from the bumper to the load and also the load that can safely be lifted at that distance, are made available to all users of Mercer Cranes. They are made of a tough card board in a size that can easily be carried in a pocket of the crane-operator's jumper.

DIESEL-ELECTRIC SWITCHING UNITS—General
Electric Co., Schenectady, N. Y. (16 pp. illustrated.) A concise statement of
the advantages of switching by means of diesel-elec-

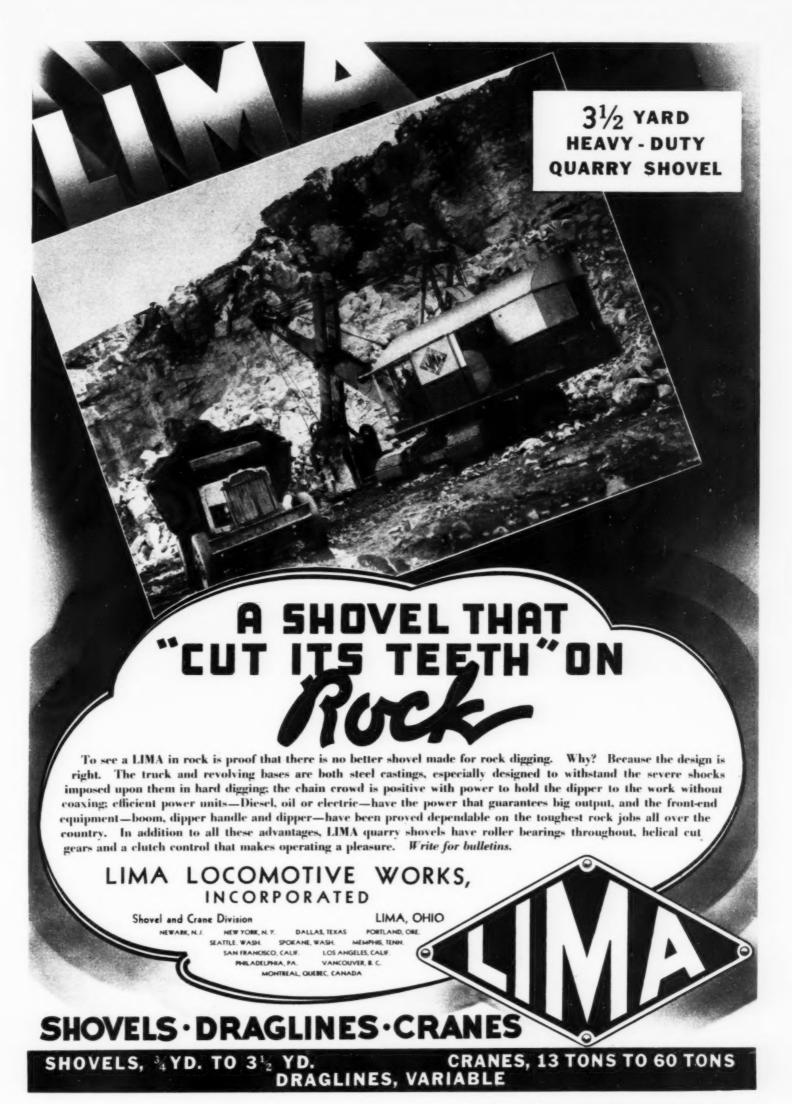


tric locomotives. Treats not only of the advantages to an industry through lower fuel and operator costs (a unit of this type can be easily handled by one man), but tells how and why the workers appreciate the convenience of its design, the many safety leatures, and the greater comfort and cleanliness afforded by the 65 ton General Electric dieselectric unit. tric locomotives. Treats not

afforded by the electric unit.

STEEL WHEELS FOR BITUMINOUS MATERIALS STEEL WHEELS FOR BITUMINOUS MATERIALS KETTLES—Littleford Bros., Inc., Cincinnati, Ohio This folder announces that Littleford Bros., realizing that the crisis in rubber has practically eliminated pneumatic-tired vehicles, has made for their 84-HD Kettle interchangeable steel wheels They have so designed the wheel that it can be replaced by a rubber tired wheel when it is again available. The folder also announces that their 84-WM patrol kettle, which always had steel wheels, is still obtainable.

GASOLINE POWERED PORTABLE AIR COM-PRESSORS—Schramm, Inc., Chester, Pa. (12 pp. illustrated.) A line of compressors built up illustrated.) A line of compressors built up around a Ford Mercury cylinder block, combined with Schramm patented mechanical intake valves, heads and intake manifold. The compressor unit has two power, and two air cylinders on each bank of the unit. The result is a well balanced four-cylinder gasoline engine with four cylinder compressors cast en bloc. By doing this, all chains, gears and belts are dispensed with, and the result is a compact, heavy-duty, lightweight compressor that effects a considerable saving in critical materials. Another advantage lies in the fact that 96 percent of replacement parts can be obtained from any Ford dealer.



* PREPARE YOUR TRUCK TO "PASS INSPECTION"



Start Using GMC PREVENTIVE MAINTENANCE Now!

Don't wait for government-sponsored tire inspections to reveal the need for adjustments or repairs to protect the life of your truck's tires. GMC's Preventive Maintenance provides for inspection and servicing of a truck chassis at 41 points, including tires, every 1000 miles. GMC was the originator of P. M. Service and its dealers have had years of experience in

of jobs. They also know many service methods and operations that save time and money. Make sure that your equipment is in condition to give its best to the war effort by having it regularly serviced at your GMC dealer or branch.

applying it to all types of trucks on all kinds

Special "Service Payment Plan" available through our own YMAC

The Truck of Value

Pledged

V.S. TRUCK

CONSERVATION CORPS

WAINTENANCE

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GMC TRUCKS

GASOLINE . DIESEL

Page 86 — CONSTRUCTION METHODS — November 1942

SELF-LOCKING NUTS — Elastic Stop Nut Corp., 2332 Vauxhall Rd., Union, N. J. (Wall chart 21x27 in., illustrated.) Wall chart, explaining uses of various types of self-locking nuts, presents illustrated description of basic principle by which self-locking action is obtained and cross-section drawings showing method of application of nine types most generally used, with corresponding photographs of these types.

sewer joint pouring compounds—Keystone Asphalt Products Co., Chicago, Ill. (4 pp. illustrated.) The sewer contractor who has a job specifying that joints be filled with a hot pouring compound should be interested in this folder, which describes Kapko Hot Pouring Compound shipped in its new fiber containers, avoiding the inconveniences of the conventional sheet-steel drum, and permitting shipment of 230 lbs. more compound per ton because of the lower weight of the container.

FOR A DENSER CONCRETE — Viber Co., Burbank, Calif. (8 pp. illustrated.) For upward of a generation the greater density of concrete that has been vibrated, has been recognized. One of the first devices whereby this end could be achieved was the Viber Vibrators. The booklet describes the various models in which this piece of equipment can be obtained, and tells the important facts about each, adding a partial list of the important jobs on which it has been employed.

FIRE RETARDANT FOR WOOD — **Albi Chemical Corp.,** New York, N.Y. (16 pp., illustrated.) Describes aqueous solution called Firepel and con-



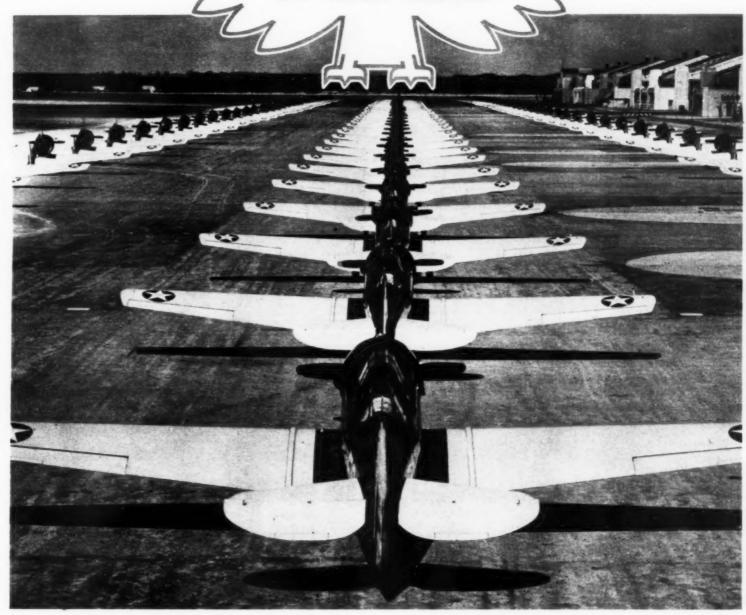
taining fire retarding chemicals which greatly increase the resistance of wood to ignition. It can be applied on surfaces not exposed to the leaching action of water, either by brush or spray is said to be non-toxic and fungicidal, to generate no irritating, suffocating or explosive fumes and not to cause corrosion of nails or other metal fixtures. Tests

other metal fixtures. Tests made by the Factory Mutual Laboratories are claimed to show that a wooden structure, when exposed to the flames of a simulated 3-lb. magnesium-thermit incendiary bomb, burned fiercely after 2 min.; while a similar structure treated with Firepel exposed under identical conditions, was only scorched.

SAVINGS OF WOOD PRESERVATION—Grant B. Shipley. Pittsburgh, Pa (36 pp. illustrated) A matter of great national concern is the rate at which we are drawing on our reserves of native timber. Although many uses for timber have been more recently filled by other materials, it still is necessary to conserve our native stands of forests. Mr. Shipley has gone extensively into the statistical aspects of this matter and has written a monograph around some 30 charts and about 15 photographs.

ENGINEERING SERVICES — Lockwood Greene Engineers. Inc.. New York, N. Y. (118 pp., illustrated.) Frontispieced by α rendition (by Hugh Ferris) of the Eastern Airlines Building at Rocketeller Center, New York City, for which this company did the structural and foundation engineering, this loose-leaf book leads us by more than 140 pictures through Camp Shelby at Hattiesburg, Miss.. The Citadel at Charleston, S. C., various textile and rubber manufacturing plants glass factories, chemical industries, publishing plants (including the McGraw-Hill Building), machinery and metal working plants, laboratory, service and storage buildings, radio manufacturers and broadcasting stations, power plants, and industrial housing, to the International House of the University of Paris—for all of which it did the engineering, either mechanical or civil, or both

Safeguarding the runways of war birds



Above is a view of a naval airfield with trainer planes lined up, ready to go aloft. It is typical of the hundreds of airfields scattered throughout the nation, many of them with runways safeguarded with Bethlehem Road Steel.

Embedded in the enormous concrete slabs of many of these runways are Bethlehem Reinforcing Bars and Mats. Though unseen, they are doing a man's sized job in preventing spalling, cracks, and disintegration, despite the sudden strains caused by the landing of heavy planes throughout the day and night, week after week, month after month.

Bethlehem Road Joints are also used in many of these runways, taking care of expansion and contraction and thus preventing buckling—a serious hazard to aircraft in landing and taking off.

In such ways Bethlehem Road Steel is playing an unseen but none the less important part in helping to win the war.

BETHLEHEM STEEL COMPANY



For SPEED and SAFETY...



OWELL **Reversible Ratchet**

You gain speed through the easy handling, strong leverage and straight-line application of power on LOWELL REVERSIBLE RATCHET WRENCHES.

The improved new types of LOWELL WRENCHES are the result of more than 70 years experience and development - 1869 to 1942. They are made in a wide range of types and sizes for all classes of heavy construction, erection and maintenance.

Have patience with your dealer if he is unable to furnish all of the numerous LOWELL types and sizes, for we are engaged, for the duration, in supplying the needs of our Armed Forces.



WORCESTER, MASS., U.S.A.



transmits leverage e solid stock of the direct to the gear, night line and with raight line and with re contact. The pawl COMPRESSION sion, no torsion. The shipper carries NONE of the load. This strong construction in-sures steady service



PUMPING YOUR CONCRETE—Chain Belt Company, Milwaukee, Wis. (24 pp. illustrated.) Certain classes of construction undoubtedly indicate the use of a definite type of plant to mix and distribute concrete. However, one type of concrete distribution plant is suitable to most, if not all, classes of concrete construction. The booklet describes in considerable detail the many different and advantageous features that characterize the Rex Pumpcrete. The general usefulness of the concrete pump is well set forth in this compendious booklet, which includes a table and a graph. a graph.

DIESEL ENGINE, POWER UNITS AND GENERA. TOR SETS—**Hill Diesel Engine Co..** Lansing Mich. (9 sheets, illustrated.) As a division of Rogers Diesel and Aircraft Corporation, New Rogers Diesel and Aircraft Corporation, New York, the Hill organization is now distributing set of sheets showing nine items of its line, which runs from a 6.8-29.7 hp., 2-cylinder bore power unit, up to a 20.4-61.1 hp. generator set. Complete specifications are given, design and construction details are listed, and a dimensional diagram shows the spacing of sub-base bolt holes and the overall dimensions for each unit.

CEMENT FOR BONDING MORTAR—North American Cement Corp., New York, N. Y. (20 pp. illustrated). Booklet contains two tables which give the cubic feet of mortar and the number of masonry units required with various thicknesses of joint, and the quantities of material for mortar using sands having different weights per cu. ft., in the various conventional mixtures. Both of these should be valuable to any contractor using

CARE OF ARC-WELDING MACHINES - The Lincoln Electric Co., Cleveland, Ohio, (Three booklets, 33 pp. illustrated.) The two instruction manuals and the booklet giving 101 ideas on low-cost maintenance should prove of interest to everyone concerned with the upkeep of machinery. The manuals contain complete directions for properly handling the arc welding machines of this firm, and the booklet shows how flexible and valuable the electric arc weld can be in alleviating the critical shortage of machinery and

ENGINEERING USES OF PLYWOOD—1.F.Laucks.
Inc., Seattle, Wash. (16 pp. Tables, price 10c)
Reprinted from Chas. B. Novis' "Technique of
Plywood" is a 16-p. booklet containing the series
of tables on the "strength and deflection of Douglas Fir plywood under loads applied normal to
the face," which should prove of value to all who
employ this modern building material in any
situation requiring that it carry normal loads,
and as a substitute for metallic sheets.

ENGINEERING INFORMATION FOR TRUCK TIRE USERS—Goodyear Tire and Rubber Co., Inc., Akron, Ohio. (14 pp., illustrated) In this book, entitled "Truck Tire Engineering Service," the Goodyear Company has put information which has the greatest value to truck owners who may be in some doubt as to whether or not they are entitled to an extra spare for their big truck. The procedure for obtaining a new tire follows a conveniently designed record for ten tires; and is in turn followed by the required procedure when a shoe must be recapped or retreaded Then turn followed by the required procedure when a shoe must be recapped or retreaded. Then comes a reprinting of List B, the official Tire Rationing Regulations, which states the types of vehicles for which application may be made for retreading and recapping tires. Also, some timely tips on the value of watching the condition of tires, and a diagrammatic exposition of the effect of speed on tire wear. Ending with clear drawings of tire cross-sections showing the relative amounts of wear on a tire that will justify (1) top-capping, (2) full recapping, and (3) retreading

CONCRETE AS A DECORATIVE FEATURE—Portland Cement Association, Chicago, Ill. (35 pp. illustrated.) Some of this country's most striking buildings, from an architectural point of view, have been erected during the recent years, using concrete not only as the structural material but also for all surfaces and ornamentation. About a score of these have been described by various technical writers. The illustrations are half-tone photo reproductions which bring out the beauty of this building material, and show its adaptability as well as the flexibility with which it can be used. Methods and practices that have brought reinforced concrete from the oblivion of basements and back walls to a highly regarded medium employed by our leading architects, are exhibited.

* * *

SAND-ASPHALT PAVEMENT—The Asphalt Institute, 801 Second Ave., New York, N. Y. (16 pp.) A specification covering the construction of the hot-mix type of sand-asphalt base and surface courses has been adopted by the Asphalt Institute and published as its "Specification A-5"



MAKING THINGS SMOOTH
—Austin-Western Road Machinery Co.. Aurora, Ill. (16
pp. illustrated.) Booklet describes complete line of machines, from A-W tandem
rollers through their A-W Autocrat, their A-W Cadet to
their Roll-A-Plane. Each machine type can be obtained
with either diesel or gasoline

drive. In addition, special attachments, such as scarifiers, designed for use with the A-W line are described.



SERVICE FROM INDUSTRIAL RUBBER PRODUCTS—B. F. Goodrich Co., Akron, Ohio. In order to assist in the national rubber conservation program, this company has printed a series of four vest-pocket pamphlets on how one can get the most service from his industrial rubber products. Pamphlet No. 1 deals with the precautions which should be observed if he expects to obtain the greatest possible use from his power-transmission belting. It points out: (1) why the usual metal fasteners are a weak link in a belt, and also states that it is now possible to secure a continuous belt by vulcanizing the splice with an electric vulcanizer; (2) the necessity of keeping oil away from all rubber belting; (3) how much belting can be saved by a properly planned program of belt salvage; (4) why the use of belt dressings should be avoided and when a vegetable oil may prove advantageous, and (5) the necessity of cleaning belts and storing them properly. Pamphlet No. 2 treats of conveyor belting and tells how one should protect belts at loading points, how to place skirt boards, how to avoid the trapping of lumps between belt and pulleys, and how to increase the tonnage delivery. The list of precautions which should be taken to protect your belting from the damage caused by exposure to light, heat, cold, moisture and mildew are given. In pamphlet No. 3, which is devoted to the care of V-belt drives, the accent is upon correct engineering design, but it also reiterates the care of the rubber and fabric that was mentioned in the first two pamphlets of this series. And pamphlet No. 4 is concerned with the general matter of "Belt Salvage."



BULLDOZERS HAVE GOT TO BE TOUGH—R, G. LeTourneau, Inc., Peoria, Ill. Illustrated broadside-poster contains photo reproductions which show graphically the toughness of the dozer, and explain the main construction features of the LeTourneau design. Mounted on a Caterpillar diesel by specially designed members, the dozer is said to handle competently jobs of snow, earth, sand and rock moving, clearing and grubbing, as well as many "in between" construction tasks.



Here's a cut-and-fill method applicable to almost every earthmoving job in rolling country. You will find it eliminates extra turns, reduces roundtrip time, and thus increases the number of big loads you can move with your present Tournapulls and tractor-drawn Carryall Scrapers.

Using individual balances, 10 turns are required to deliver 5 pay loads. By balancing the series of cuts and fills, so you can haul in both directions, you deliver 5 pay loads with only 2 turns. Each turn eliminated gains an average of 0.25 min. or 2 full minutes on this cycle.

Gain \$31.50 per Day

Assume a 10 pay yard load and 5.0 min. per load, then on the basis of individual balances you could deliver 120 cu. yds. hourly. With the above turn-eliminating cycle, you save 2.0 min. each 5 loads and increase your hourly yardage to 130 cu. yds. That's a gain of 210 extra yards per Carryall Scraper each 21-hour day. At 15c a cu. yd., this elimination of turns amounts to \$31.50 per day or \$15,000 on a 10,000 hour operating life!

Figure the increase in yards and profits for your job and Carryall Scraper fleet. The gains will vary with the Scraper size and haul distances, but you'll find the method always increases the number of loads and yardage—without an increase in equipment. Put this Victory-speeding method to work TODAY.

Contractors and Engineers — Let This

LeTourneau Estimator

Help You Figure

Earthmoving Jobs

Free, easy-to-read slide rule covers both track-type tractor and automotive-type earthmoving units from 10 horsepower and up. Applicable to all makes and models. Enables you to estimate quickly and accurately:

Hourly production • Maximum speeds • Horsepower required • Travel Time • Costs

Estimator design is based on field observations and estimating requirements gained after consultation on several thousand earthmoving jobs. Complete instructions, with typical examples, accompany each estimator. Get your LeTourneau Estimator NOW. Let it help you figure your earthmoving jobs. Address: Dept. CM

ETOURNEAU

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELL TRACTOR CRANES.

Name Reg. U.S. Pat. Of.



Cement Dispersing Agent For Paving Concrete

THE MASTER BUILDERS CO., of Cleveland, Ohio, has recently placed on the market a cement dispersing and air entraining agent known as HP-7 which, when added to a paving mix, is claimed to improve all the essential qualities of concrete — transverse strength, resistance to wear, freedom from scaling. Furthermore, it appears that this is accomplished with little or no increase in cost, and in some cases with an actual reduction.

HP-7 is essentially a combination of an air-incorporating agent (sodium lauryl sulphate) with a cement-dispersing agent (a derivative of lignin sulphonic acid).

The manufacturer points out that as HP-7 is a mixture of definite compounds in definite proportion, its use is subject to perfect and complete control. It is noted also that while these ingredients can be used separately, and each is effective in its own way, it is only by the combination that the fully beneficial effect is attained.

Concrete Base For Blast Furnace

(Continued from page 59)

entered a gasoline-driven pump and was forced through the 400-ft. pipe line to a point of delivery above the circular base of the furnace whence it was discharged into the forms by radial chutes, as illustrated.

In the first pour for stove and stack foundations, 1,512 cu. yd. of concrete aggregate were poured in 40 hr. Subsequently, 1,606 cu. yd. for the outside ring of the main furnace base and another stove foundation were poured in 41 hr.; 2,172 cu. yd. for the center portion of the main furnace base were poured in 50 hr. 50 min., and 758 cu. yd. for the skip-house and skip-hoist foundation, elevator foundation and skip-pit footing were poured in 23½ hr.

Fourteen truck-mixers were employed on the job. The combination of the pipe line and pumping system reduced truck haulage time by more than one-half, and effected a further saving of pouring time at the job, making it possible to complete the pouring of the foundations without any interruption in the foundation schedule sequence.

4 MORE FLEETS THAT HAVE

SAVED - GASOLINE - MOTOR OIL - AND EQUIPMENT

WITH STANDARD OIL'S

FLEET CONSERVATION SERVICE



On-the-job discussions of fleet engine problems are an important part of Standard's Fleet Conservation Service. The discussion, pictured above, between a Minnesota freight line operator (left) and a Standard Automotive Engineer is typical.

On this fleet this service resulted in adding one mile per gallon to average gasoline consumption, and solved a gum formation problem which was causing short valve life and carburetor trouble.

On the North Star Lines bus fleet (below), Grand Rapids, Michigan, Standard's Fleet Conservation Service helped the chief mechanic increase gasoline mileage 10 to 12% through the accurate analysis of compression pressures and exhaust gases and the resultant adjustments that were made. Operators commented on the improved acceleration of the buses.





Ralph Hempel, owner of Ralph's Transfer, St. Paul, Minnesota, reports both gasoline and motor oil savings and improved maintenance economy resulting from the Fleet Conservation suggestions made by Standard Automotive Engineer D. R. Stapleton. In the picture above, Ralph Hempel (left) and the Engineer are discussing the importance of preventive maintenance records.

New heat-proofed STANOLUBE H. D. AN IMPORTANT AID IN CONSERVING FLEET EQUIPMENT



Where sludge and varnish troubles are shortening equipment life and piling up maintenance costs, the first suggestion a Standard Engineer will make is a test of Stanolube H. D. It's heat-proofed to stand the heaviest service in gasoline and Diesel engines. W. H. McConighen (left), Automotive Engineer at Milwaukee, recommended Stanolube H. D. for certain troublesome engines in the Schiffmann Cartage fleet. After this test, Ray Schiffmann (right) says—"Our sludge problem is over. This oil is living up to all claims made for it."

Put Standard's Fleet Conservation Service and Stanolube H. D. to work for you. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois for the Engineer nearest you. In Nebraska, write Standard Oil Company of Nebraska, at Omaha.

Sign up your fleet in O.D.T.'s Truck Conservation Corps. Help in this vital war effort by keeping your trucks rolling for the duration.



STANDARD OIL COMPANY (INDIANA)
FLEET CONSERVATION SERVICE



Eliminates split batches

Can discharge small portions of concrete, close doors and move boom to other locations.

· Saves time of bucket travel for split batches.

Doors open or close to any degree at any position on the boom.



RANSOME MACHINERY COMPANY



clips days off Airport Construction

We crossed a material spreader with a road roller and made the Universal "Chip-Top" Spreaderoller. In fact,

We crossed a material spreader with a road roller and made the Universal "Chip-Top" Spreaderoller. In fact, the Spreaderoller is more than either for it screens as it spreads—depositing coarse material first, medium next and chips on top—and it simultaneously rolls a 10' wide strip, firmly and smoothly, once over.

One machine—one operator—does an excellent seal coat paving job in one operation. Does a spreading job that cannot be duplicated by regular spreaders or by hand spreading. Deposits 15 to 25 lbs. per sq. yd. Hopper is loaded from towed ramp—fewer trucks required. Rolls with no seams—no broken shoulders. Surfaces up to 1 mile of runway or road per hour.

This unique equipment is helping Uncle Sam with the big job of building pilot training centers and defense air bases. Their speed, performance and economy on these jobs are a matter of record.

Get the facts on this "war machine" that has the answer to fast, low cost post-war bituminous paving and maintenance, Send for Bulletin 800-B.

UNIVERSAL ENGINEERING CORP.

327 8th STREET WEST. CEDAR RAPIDS, IOWA



Seabees

(Continued from page 50)

- but he is introduced to the basic training of a soldier. He learns to drill in close order and to handle the equipment of a soldier. He receives instructions with rifle, pistol and bayonet, hand grenades, sub-machine guns, chemical (gas) warfare, air-raid protection and base layout. Naturally the accent is upon military training, since the average recruit needs more preparation for this than for his usual construction work.

On their experience record, checked by observation, twelve men, or a total of 180 men, from each battalion of approximately 1,000 men, are picked for more intensive training in each of fifteen classes. The first eleven of these classes are general, or primary, in their character, and cover: Boilers and heating; diesel and gas engines; dynamiting; evaporators and purifiers; generators and electricity; air-raid protection and camouflage; pontons, propulsion units and dry docks; tanks and radio masts; refrigeration; welding; small arms.

To the above classes have been added,



POWER SHOVEL AND CRANE OPERATION is taught members of Construction training center, Norfolk, Va.

for further advanced training, the four following subjects: Concrete forms and carpentry; diving; excavation and earthmoving; hut erection and firefighting.

The men who are picked to take any of these advanced subjects are relieved of their regular duties for half of each day, and spend these four hours attending lectures or working in laboratories. The purpose of this specialized training is to create capable foremen, men who will familiarize themselves with the assembling, operating and repairing of advance-base equipment, and will learn to handle all the various steps necessary

(Continued on page 94)

1CTOP TIE The output of any shovel depends on the operator's "know how." Check your shovel performance with the list below and perhaps you'll find a point or two that will help. We all want to win this war the quick way . . . let's go! Keep your friction clutches right. Keep the swing short . . . spot You can't dig fast with a sloppy clutch adjustment. trucks in close. Loosen the bank while you wait for trucks. Cut a thin slice up along facts of the dipper comes up fast and easy. Don't overcrowd! Overlap your cycle . . . have dip-per at right height for dumping when it swings over truck; swing and lower; come in crowding. Keep dipper teeth sharp. Set pitch braces for fast digging. Angle of teeth should usually match average angle of bat.k. Move up often, work your bank Steady does it - keep 'em swinging. **FOR VICTORY** WAR BONDS Z U W 1 5 C 0 7 S 1 U T H LW A K E 0 M E.

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THE ARMY AND NAVY SAY-

Well done CLYDE



"FOR HIGH ACHIEVEMENT IN THE PRODUCTION OF WAR EQUIPMENT"

Proudly we announce that we have been awarded the coveted Army-Navy "E". "For high achievement in the production of war equipment" the citation reads . . . it is in recognition of the Clydes' production accomplishments and a tribute to every employee for their cooperation, loyalty and determination.

The Clyde Iron Works, Inc. has long been known as a leader in the manufacture of Hoists, Derricks, and Whirleys. During normal times our equipment has been shipped to over sixty foreign countries . . . these machines have been dismantled and flown into the gold fields of Alaska and New Guinea by plane . . . packed into the Andes by burros. Almost every construction project of any importance has had some Clyde equipment to help speed up production schedules.

The peace time "know how" and high precision standards of workmanship, developed throughout these many years, are now being applied to the exacting task of producing Shipyard Whirleys and Deck Machinery for our Nation's war needs. The Army-Navy production award is a stimulus to even greater accomplishments.

The formal presentation was held October 7, 1942.



CLYDE IRON WORKS, Smc.

DULUTH-MINNESOTA

(Continued from page 92)

to trans-ship and set up water-purifiers, salt-water evaporators, boilers, pontons, air compressors, and the like. They will learn the proper ways of handling dynamite and welding equipment, as well as a host of special gear.

Selected Men as Instructors

All instructors come from the list of selected men. A good instructor, who is either a graduate engineer with considerable practical experience or a thoroughly experienced worker with special teaching ability, will probably remain at these training camps for quite a while before he, too, is sent with a battalion to advance base duty. However, being selected for this special training does not raise a recruit's rating



CONCRETE FOOTING is poured during training period devoted to building and other types of construction.

which he receives upon enlistment. A change in rating can only come in the field as a reward for meritorious performance.

Education for War and Peace

With gun in one hand, and shovel or hammer in the other, the Seabees can drop the tools of their accustomed peacetime skill, and — like the embattled farmers of Lexington — pick up their guns to beat off enemy attacks. Each man will have gone through eight weeks of education in both the bitter art of war and the constructive job of peace. He may then be sent, with his buddies, to India, Ireland or Iceland, or perhaps to Alaska or Australia.

Talk about Joining the Navy and Seeing the World! Here is the practical guarantee that, if you are really good, you will get your bellyful not merely of excellent Navy grub, but also of building and scrapping. Not a bad menu for anyone.

The Seabees' tradition is certain to be excellent, but it is still to be made. Wouldn't you, Mr. Carpenter, and you, Mr. Concrete Handler, and you, Mr. Jack O'Altrades, like to have a hand in its making? Ask at your nearest Navy recruiting station for complete infor-

(Continued on page 96)



THIS "WOODEN SOLDIER" **GUARDS THE HOME FRONT**

War comes first! Steel must not be used in any drainage structure except where engineering integrity demands it. Now drainage problems on the important "home front" are being solved efficiently and economically by the ARMCO Emergency Wood Pipe.

This completely new design in wood pipe requires no steel sheets and bands, wire mesh, metal reinforcing or other critical materials. It is strong yet light in weight - easy to handle and install. On the durability side ARMCO Emergency Pipe is designed to outlast the 5 to 10-year period for which most military

ed

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construction is intended. On more permanent installations, when replacement becomes necessary a corrugated metal pipe may easily be threaded through or jacked around the wood structure.

Remember that ARMCO Corrugated Metal Pipe is only on temporary "leave of absence." It will be back with its flexible strength, ease of handling, tight joints, long lengths, and low installation costs. Asbestos-Bonded coatings and bituminous pavements also will be back to guard against corrosion-erosion.

In the meantime can we assist with your drainage problems? The answer may lie in the tures. Write us. Armco Drainage Products Association, 1065 Curtis St., Middletown, O.



RMCO EMERGENCY



PORTABLE CRUSHING UNIT with V-BELT DRIVE

More **CRUSHING** with least EFFORT and POWER or any other Reliance.

plus

This speedy Reliance Portable Unit can be used with equal profit -1st - as a Crusher alone, or -2nd - in combination with Elevator, Chute, Screen, etc. Note the low feed opening at a safe distance from the balance wheels. Note the reliable powerproducing V-Belt Drive. Note the low center of gravity for stability. For strength, simplicity and economy you can't beat this

 OTHER PRODUCTS - Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revolving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettles, Bin Gates; Feeders; Belt Conveyors; RUGGED DURABILITY Grisslies; Air Separators; Sand and Gravel Spreaders; Wash Boxes

UNIVERSAL ROAD MACHINERY CO.

Kingston, N. Y., U.S. A.

DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

... If you want to make speed profitably . . . GET DEPENDABLE EQUIPMENT . . Buy the Fast . . .

Mydraulic Concrete Vibrator

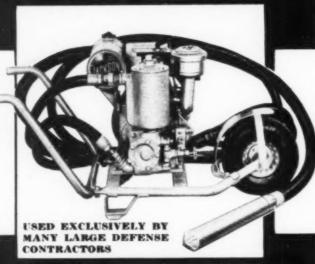
DESIGNED TO "TAKE IT" 3 SHIFTS A DAY EVERY DAY

Automatic pressure lubrication-requires no attention. 34-ft. hose - 23/4" vibrator head.

Adjustable frequency to 6800 R.P.M.—submerged in concrete. Powerful gas engine—4.7 H.P. Long lived, ball-bearing, ro-

tary, hydraulic pump. (Used exclusively by many

large defense contractors).



ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON, MICHIGAN

Page 96 - CONSTRUCTION METHODS - November 1942

(Continued from page 94)

mation. Seabee recruits, who must be between the ages of 17 and 50, will enter the Navy under Class V-6 and will be rated from Seaman, 2nd class. to Chief Petty Officer. The base pay ranges from \$54 to \$126 a month, including housing, food, clothing, transportation, medical and dental care and other incidentals to which all Navy enlisted personnel are entitled. For service abroad a 20 percent increase in the base rate of pay is allowed. In addition. standard allowances are made for dependents.

Alaska Highway

BL

Cen

made by the Army for winter maintenance of the road, including the construction of rest camps for the oper-

ators of truck convoys, barracks for engineer maintenance troops and adequate weather observation and tele-

phone installations.

The construction by the Army of the pioneer route through the virgin wilderness in such a short time constitutes an engineering feat of first magnitude. It was not accomplished without physical hardship on the part of the officers and men, but no handicaps of weather or terrain were sufficient to retard progress. Aside from the efficiency of the force, among whom a large detachment of Negro troops acquitted themselves with special distinction, three main factors, the War Department states, contributed to the speed with which construction has been carried on:

Speed Factors

The first was the simultaneous start of construction at various points along the route by transporting crews and equipment to strategic locations before the spring thaw of 1942 made trails and rivers impassable.

The second was the employment of aerial surveys and stereoscopic analysis of the aerial photographs, followed by ground reconnaissance on foot.

The third was the use of bulldozers, tractors and other types of heavy equipment. The primary road was actually established by the powerful bulldozers, which plowed through the forests of native spruce, jackpine and aspen, uprooting and pushing trees off a 100-ft. right-of-way, leaving the work of clearing to be handled by relatively small forces of men.

Timbers were felled for the construction of bridges, trestles and other structures and cut to dimension by sawmills

(Continued on page 98)

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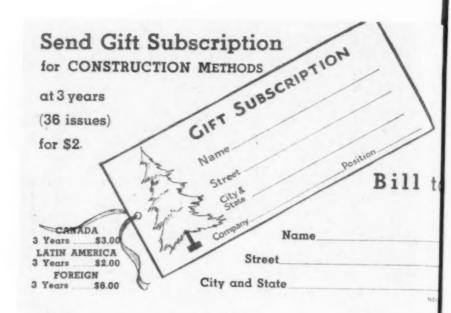
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CONSTRUCTION METHODS

McGRAW-HILL PUBLISHING CO., Inc.

330 WEST 42nd STREET

NEW YORK, N. Y.





How can time be saved? How can we make the best use of our raw materials now so urgently needed for so many purposes?

With Wire Rope the answer is in using the quality, construction and type that can be installed the quickest . . . that will deliver the most hours of work per pound of steel.

You can depend on Preformed "HERCU-LES" (Red-Strand) Wire Rope for maximum efficiency. As it is easier to handle, it can be installed quicker. In addition to saving time, its longer service saves steel for other vital uses.

As Preformed "HERCULES" is furnished in both Round Strand and Flattened Strand constructions, there is, in this one grade, a right

rope for every heavy duty purpose. You will like its smooth spooling . . . its stamina . . . its dependability.

In order to help all wire rope users obtain maximum service from their wire rope, we publish an illustrated booklet "Practical Information on the Use and Care of Wire Rope". We shall be glad to send a complimentary copy to anyone interested.

A. LESCHEN & SONS ROPE CO. WIRE ROPE MAKERS 5 90 9 KENNERLY AVENUE NEW YORK ... 90 West Street CHICAGO ... 810 W. Washington Blvd. DENVER 1554 Wazee Street

on the site. Ferries were improvised, and at one major stream crossing a scow was built capable of carrying 40 tons.

Weather Conditions

During March the troops battled bitter winds and temperatures as low as 35 deg. below zero. During July and August they sweltered under a heat of more than 90 deg., and were forced to



WELDING EQUIPMENT serves a variety of maintenance, repair and construction purposes on Alcan Highway.

wear gloves and net helmets to protect themselves from swarms of mosquitoes, flies and insect pests. In wet weather they slogged through bottomless mud; in dry weather portions of the road were shrouded in clouds of fine alluvial dust,

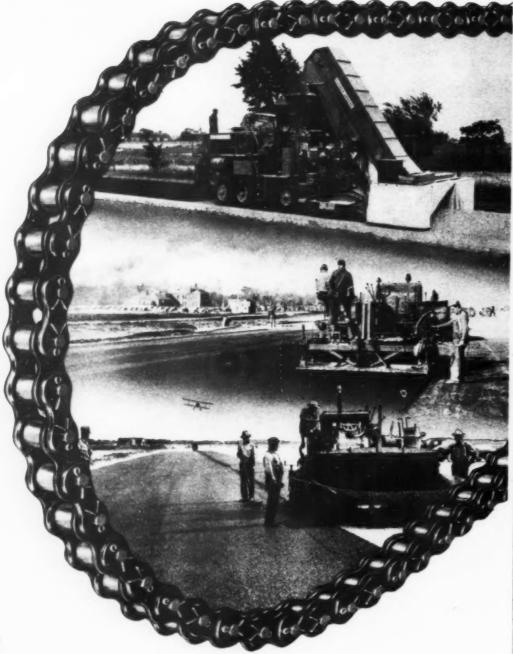
Through it all, however, the morale of the men remained high and the job has gone forward at a rate which will bring the road to completion well in advance of the most optimistic estimate. The threats of muskeg — a bog moss studded with sedge—proved wholly unfounded. Most of it has been successfully skirted and that which was unavoidable has been overcome with corduroy roads.

Metallized Coating Protects Steel Surfaces

(Continued from page 67)

and outbound traffic during various parts of the day, the movable curbs are made up in 25-ft. sections mounted in pavement slots on electrically-operated hydraulic jacks controlled from central

(Continued on page 100)



aying It Down With Barber-Greenes The Important Drives Are Diamond Roller Chains

• Speeding roadways, encampment areas, airport runways — Barber-Greene Finishers have been putting in many extra hours in all parts of the country. Like most leading makes of construction machinery, they have Diamond Roller Chain Drives incorporated in their design.

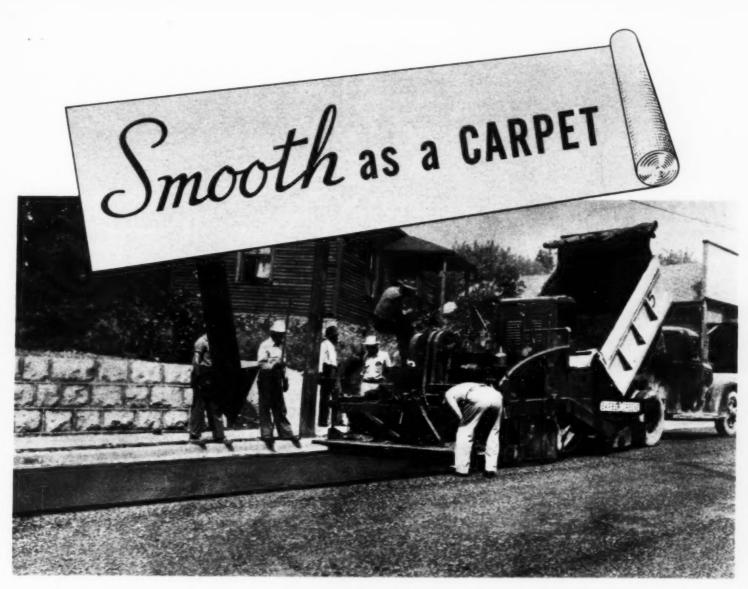
Such regular use of Diamond Roller Chains is the result of long years of successful performance, establishing such advantages as,—reliability under adverse conditions; reserve power to withstand long hours of operation and shock loads; positive action; high sustained efficiency; and ease of maintenance.

Diamond Roller Chain Drives are compact and unusually easy on bearings, too,—they serve equally well on short or long centers, and over a wide range of speeds. Their uniform accuracy is a result of 52 years of engineering development, modern precision machinery and long-experienced skilled craftsmanship. When the equipment you buy is equipped with Diamond Chain Drives you can expect sound engineering and construction throughout. For replacements write "Diamond" on your order . . . DIAMOND

CHAIN & MFG. CO., 418 Kentucky Ave., Indianapolis, Ind. Offices and Distributors in All Principal Cities.

ROLLER CHAINS

DIAMONI



TEXACO Asphaltic Concrete pavement being laid by mechanical spreader in Paris, Ky.

Note the smooth, true, joint-free surface of this TEXACO Asphalt pavement, as it is laid down by the mechanical spreader.

Closely on the heels of the spreader follows the roller, scientifically compressing the loose mix to a uniform thickness.

The pavement is then ready to receive traffic.

There you have another important advantage of TEXACO Asphalt paving for street, highway or airports . . . its speed of construction. Traffic is subjected to a minimum of delay and inconvenience when the pavement is TEXACO Asphalt, laid by modern methods.

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TEXACO ASPHALT

NOW you can get 10 basic books of DAY-IN-DAY-OUT VALUE TO THE CIVIL ENGINEER in one handy volume that—

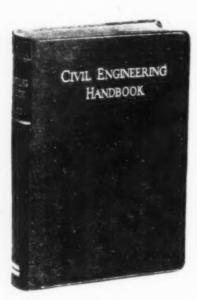
- ... answers your questions in any division ... blends theory, practice and fundaof civil engineering:
- mentals equally;
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- ... is reasonably priced.

CIVIL ENGINEERING HANDBOOK

Editor-in-chief: Leonard C. Urquhart, Professor of Structural Engineering, Cornell University. Second Edition, 870 pages, 6 x 9, over 900 illustrations and diagrams

Here are the fundamentals of the various subdivisions of civil engineering for men who actually plan, select, design, and construct civil engineering structures and projects. In each division a noteworthy specialist has contributed a compact treatise, developing fundamental theories as well as stating more involved ones, making the book not only a comprehensive reference work of modern civil engineering practice, but also adaptable for systematic study of any of the fields represented in it.

In this new edition you will find latest surveying practice carefully defined; new developments in highway and railroad work thoroughly covered; specialized recent data on design and construction of framed structures; new specifications for concrete and steel design to conform to latest approved specifications; important new data on foundations, sewerage and water supply.



Here in one handy volume is the practical, up-to-date information you need on: -

- Stadia surveying

 —Land surveying

 —Topographic mapping

 —Hydrographic surveying

 —Railway turnouts, connecting tracks
 and crossings

 —Widening, spiraling and banking of
 highway pavements;

 —Highway administration and finance;

 —Highway materials and tests;

 —Construction costs of roads and pavements
- anics of Materials
- Fluid pressure
 Pipes and open channels

- Flow of viscous fluids

 Measurement of flowing water

 Roof trusses

 Dead-load stresses in bridge trusses

 Lateral forces on bridge trusses

 Arches

 Slope-deflection

 Moment distribution

 Riveting and welding

 Bearing plates and grillage beams

 Bridges

 Mill Buildings

 Multi-story buildings

 Design of concrete mixtures

 Mixers and mixing

- Buildings and walls, footings and foundations
 Concrete arches
 Box culverts and rectangular frames
 Properties of soils
 Mechanics of soil resistance
 Caissons
- -Mechanics of soil resistance
 -Caissons
 -Underpinning
 Sewerage and Sewage Disposal
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Everything about this new handbook points to its usability: its large page size, large illustrations and type size; its many illustrative problems; and the comprehensive selection of reference tables and formulas to augment the text matter. You can use it to check your methods, keep abreast of the field, and solve many specific problems of practice. See itadd it to your library today - as a new, needed, and valuable engineering tool.

Send me Urquhart - Civil Engineering Handbook, 2nd Edition, for 10 days' examination on approval. In 10 days I will send \$5.00, plus few cents postage, or return book postpaid. (We pay postage on orders accompanied by remittance.) Name Address City and State Position Company (Books sent on approval in U. S. and Canada only

(Continued from page 98)

stations. The hydraulic jacks raise the curb 8 in. above the pavement. When retracted, the top of the curb (paved with white cement concrete between the steel side plates) is flush with the surface. A complete 25-ft. curb section weighs about 4,100 lb.

Applying Metallized Coating-As indicated by accompanying photographs. the steel frame for a 25-ft. section. prior to placing of the reinforced concrete top surface, is set up in a trunnion mounting in a metallizing shop to permit the unit to be rotated as workmen apply the thin zinc coating with handheld metal spray guns to the gritblasted steel. Metallized zinc coatings of the thickness specified for this work by the Chicago Park District furnish an impervious seal against moisture penetration. To produce maximum density in the zinc layer, the standard adjustments on the metallizing guns provide a finely atomized spray.

Old Rails Reclaimed From City Streets

(Continued from page 53)

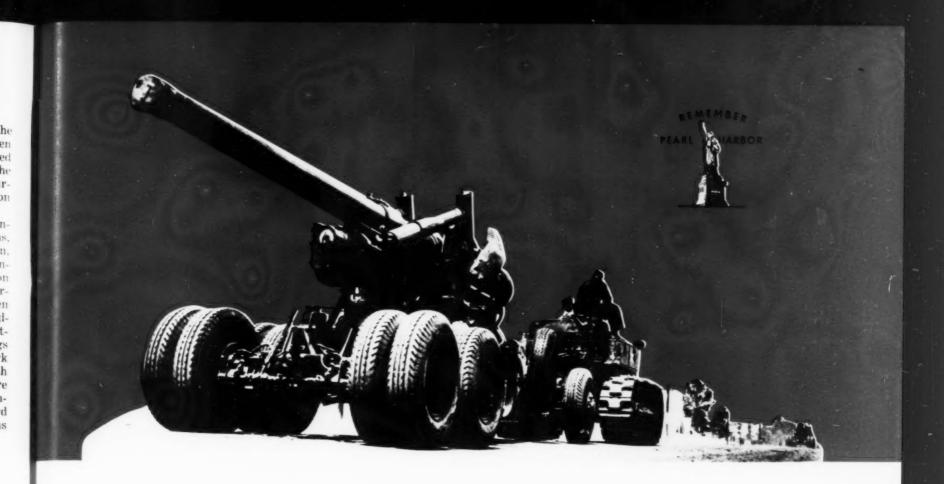
tion of the cost of removal. And, vice versa, when the pavement had about reached the end of its estimated useful life.

Rail Removal Methods

The methods employed to remove rails varied from one city to another, and depended mainly on the kind of pavement in which it was embedded. Furthermore, all broken areas in the street, had to be brought to conformity with the undisturbed portions of the original pavement. For instance, in removing Milwaukee's double tracks, the concrete was trenched 12 in, wide along the outside of the outer rails and along the inside of the inner rails. Concrete was taken out to the base of the rail, rail fasteners were unscrewed, and the rail was lifted out and hauled away.

In Green Bay, rail removal has been made definitely a part of the local war program. All the steel that has been removed this year has been sent, on order of the WPB, to the Leatham B. Smith Ship Building Co. In this city rails to be removed are from a single-track line. Trenches 12 in, wide were cut in the concrete on the outside of each rail, the screw fastenings were battered over, and the rail pried out. Rails had been welded at most of the joints, so it became necessary to cut the concrete away

(Continued on page 104)



"Tell me, pretty maiden, are there any more at home like you?"

That depends—depends urgently, upon the supply of steel on hand among the makers of these big guns. And, thanks to the ever-growing number of builders and contractors using Richmond's form-tying devices, more steel is being made available for these armaments so vital to our National Victory. Because, as compared, for instance, with "make-shift", "home-made" wire, band or rod ties fabricated on the job—

RICHMOND MAKES I TON OF STEEL DO THE WORK OF 3 TONS

—with specific advantages, that make Richmond form-tying devices and accessories the most economical to use. The "Richmond Way" is the profitmaking way, in concrete form work, due to three outstanding features. First, a complete line of more than 85 different form-tying devices, specifically engineered for different jobs. Second, a free technical and estimating service that saves many hours of weary work by providing completely detailed plans and data especially for your job.

Third, an immediate and substantial cash saving in not having to buy working parts, such as Tylags, Tycones, Flat Washers, Tywrenches, etc. Richmond loans them to you! Every builder and contractor who, today, turns to Richmond contributes two tons of steel to National Victory for every ton of Richmond's form-tying devices he uses. The job goes faster. The cost is less. The profit is larger. We welcome any opportunity to provide figures that establish these facts.

We Sell All Types...We Recommend Only Prefabricated Ties...They Cost Less!

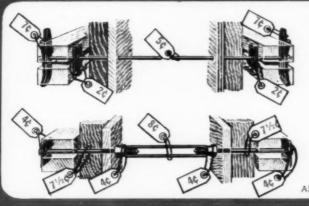
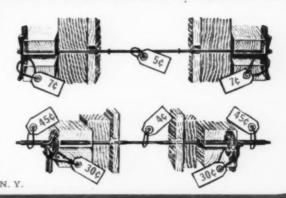


Figure it for yourself! HERE ARE THE PRICES.



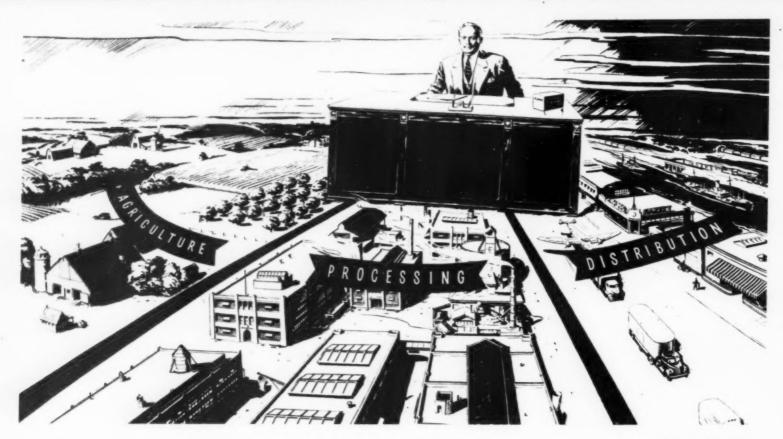
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ALL PRICES F.O.B. BROOKLYN, N. Y

RICHMOND SCREW ANCHOR CO., INC.

816-838 LIBERTY AVENUE

BROOKLYN, N.Y.





America needs a Food Administrator-NOW

In war or in peace, you and your fellow Americans require 1,465 lbs. (raw weight) of food every year. Soldiers require even more.

In all, for ourselves and our allies, America must produce, process and transport 250 billion pounds of food per year, for the duration, and for many years thereafter.

Don't try to remember that figure, but do remember that food processing is a huge industry, in a high state of technical development, but not yet fully coordinated into the war effort.

The food industry needs over-all coordination, comparable to long-last rubber coordination. America needs an administrator of food supply; to assure priorities in equipment and transportation and to end conflicting and overlapping committee jurisdiction.

If the food supply gets into a tangle, through lack of a comprehensive plan, the result will make the rubber shortage seem a picnic in comparison.

▶ In the impending pandemonium, the Food Production Engineer will be strictly in the middle. He is neither a grower nor a global strategist, but a production man who must needs wait for government to call its shots on growing, equipment production and distribution.

The Food Production Engineer must see that the food is grown in proper quantities, at proper distances from his plant, and delivered in perfect condition... From that moment, he has all the problems of ordinary manufacturing, plus the job of contriving to retain the fleeting qualities of color, aroma, taste, texture and nutritive value which nature intended only for a few brief hours of ripeness.

That was tough to do, even in the days of unlimited refrigeration and canning. But under the urge of saving cargo space for men and munitions, new miracles have been worked.

Fortunately for us, in the continuous battle between bulk and low cubic content, the latter is winning.

Food Production Engineers—by developing machines and processes for trimming and compressing—have reduced whole sides of beef to a carton the size of a suit box.

They have replaced sunken refrigerator ships by lining the holds of ordinary cargo vessels with boxes of frozen lard. Preserved by this Yankee "ice house" trick, frozen meats arrive overseas in perfect condition—while the lard goes to allied explosives plants for making TNT.

Eggs, stripped of their shells, travel through a fabulous array of processing machines, leaving space-taking water in America, but sending every ounce of energy-giving food value to our far-flung armies and allies.

When the Food Processor gets through with a basket of ripe tomatoes, you can hold the resulting cellophaned package in the palm of your hand... and only replaceable water has been lost.

► The work these men are doing will easily be the equivalent of launching a ship a day, as the processes which have been perfected are applied in more and more food plants.

If, under the constant pressure of tire, tin, and freightcar shortages, you find yourself sitting down to meals of dehyrated meats, fruits and vegetables, you can thank the Food Production Engineer for the fact that the tomato dishes will be ripe—red and delicious in taste, that soups are full-flavored and nourishing. That nothing has been lost but the water you have replaced.

Reprints of this advertisement are available in handy booklet form.

McGRAW-HILL PUBLISHING COMPANY, Inc.

This advertisement appeared in a group of newspapers on Tuesday, October 13, 1942

How do you get the cube root of a cow?

READ the newspaper advertisement, reprinted opposite, and you'll see we are telling the public (and government) about the job engineers are doing in stuffing bigger food production into fewer ships.

When you get to that part of the ad that tells about Food Engineers reducing a cow's carcass to the size of a couple of suit boxes, you will have reached the point where McGraw-Hill really lives.

In Food Production, too, it's our job to collect the "how-to-do-it" news on each new advance in technology and equipment, and pass on this information to an entire industry.

The Industrial Press of America implements the exchange of ideas, which is a national characteristic and one of the secrets of our industrial development.

Through the interchange of ideas, made possible by the Industrial Press, the sum of American technical genius is greater than the sum of its parts.

If a food engineer in Illinois learns how to add and control Vitamin A in a food product, all food manufacturers learn how it was done, through a magazine like FOOD INDUSTRIES.*

If a manufacturer develops a new dehydrating machine, production men learn what it will do and how it operates, through the informative and helpful advertising that is characteristic of the Industrial Press.

No matter what your industry or your job, you can probably remember many instances where an industrial magazine has helped you find a solution to a production problem.

But valuable as they are, Industrial Magazines cost only a few dollars per year.

That's why the route slip is so puzzling. If a man needs to see a magazine at all, he should not be under pressure to pass it along.

For help in studying the proper distribution of technical magazines among the men in your organization, write to the Reading Counsellor, c/o McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York.

THE McGRAW-HILL NETWORK

23 publications, which gather "war-news" from the "war-production-front" through a staff of 153 editors and 725 engineer-correspondents . . . More than 1,000,000 executives, designers, production men and distributors use the editorial and advertising pages of these magazines to exchange ideas on war-production problems.

THE McGRAW-HILL BOOKS

Publishers of technical, engineering and business books for colleges, schools, and for business and industrial use.

McGRAW-HILL PUBLISHING COMPANY, Inc.

330 WEST 42nd STREET

THE McGRAW-HILL NETWORK OF INDUSTRIAL PUBLICATIONS

American Machinist Aviation **Bus Transportation Business Week** Chemical & Metallurgical Electrical West Engineering

THE CANADA CONTRACT TO STREET STREET, STREET,

Construction Methods **Electrical Contracting** Electrical Merchandising Electrical World

Electronics Engineering & Mining Journal E. & M. J. Metal and Mineral Markets Engineering News-Record Factory Management & Maintenance *FOOD INDUSTRIES-Shows how to Munage Production, Retain Nutrition and Appetite Appeal.

Mill Supplies **Product Engineering** Textile World Transit Journal Wholesaler's Salesman

from the joint along the inside of the rail to permit the welded plate under the joint to be removed with the rail.

Since, in most cases, street car rails have lips to accommodate wheel flanges, care must be exercised in chipping concrete vertically for the full depth of the slab on the inside of rails to assure a good bond between the old concrete slab and the new concrete placed to fill the space from which rails have been removed.

Typical Repaying Practice

Typical of repaving practice is that done in Kenosha, where ultimately 50,000 lin.ft. of rail will be taken out. Here \$47,000 federal funds and \$7,400 city funds have been set up for the purpose. New concrete to restore the cut surface of the pavement is uniformly 71/2 in. thick for the full track zone width of 8 ft. So far, track has been taken out of streets paved with brick or with stone macadam. Concrete is mixed on the job in a 14E mixer and deposited by spout from the mixer. It is struck off and finished by hand, then cured under damp sand for 14 days. Expansion joints are placed at 100-ft. intervals, with dummy contraction joints at 20-ft. centers between expansion joints. Neither distributed reinforcing, nor tie bars or dowels are used.

Small portable air compressors and batteries of air hammers are used to break out the old paving material. This is loaded either into trucks directly, or hauled to side streets for reloading into trucks by bulldozers with elevating bucket.

Compact Concrete Plant Pumps 500,000 Yd. In 5½ Months For Twin Drydocks

(Continued from page 58)

forms, at any convenient time after adjacent blocks had been in place 48 hr. For the sake of simplicity in lining up the walls with the floor, the bottom lifts of adjacent wall forms were fabricated as part of a floor unit. Upper wall forms were set on the lower lifts and were fastened to them with aid of divers. A wall section was equal in length to three floor sections. No concrete was placed in wall sections until the adjoin-

(Continued on page 106)



Page 104 — CONSTRUCTION METHODS — November 1942





"The marines have landed and have the situation well in hand."

It's "know-how" that has won for the marines their enviable reputation as a fighting force.

And it's "know-how" that has won for Raybestos its enviable reputation for correct and dependable friction materials.

When you specify Raybestos, you get friction materials of 37 years proven quality and performance, specially engineered to meet the exact requirements of every machine that you operate!

Specify Raybestos. Fastest deliveries assured through your local Raybestos distributor. See him or wire us.

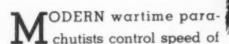
THE RAYBESTOS DIVISION of Raybestos-Manhattan, Inc., BRIDGEPORT, CONN.

RAYBESTOS IS AMERICA'S BIGGEST SELLING BRAKE LINING

Ray bestoon INDUSTRIAL FRICTION MATERIALS

FOR SHOVELS . CRANES . HOISTS . TRACTORS & EARTH MOVERS

CONTROLLED SPEED
OF OPERATION



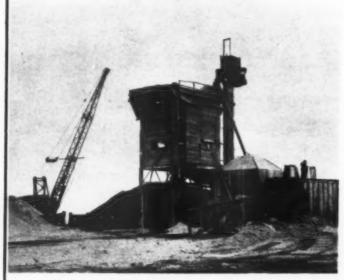
descent and directional drift by shroud-line manipulation. Owen bucket closing speed is inversely proportionate to closing power and adjustable reeving makes possible maximum closing speed or maximum closing power whenever either are required by digging or rehandling conditions.

THE OWEN BUCKET CO.

6020 Breakwater Avenue, Cleveland, Ohio Branches: NEW YORK, PHILADELPHIA CHICAGO, BERKELEY, CAL.

OWEN BUCKETS

WHEN YOU DO IT WITH READY-MIXED, YOU CAN DO IT FASTER WITH A BUTLER PLANT



This highly portable set-up consists of an 85 cu, yd. bin with three compartments for aggregate and one for cement, and a 70 cu, yd. ground cement storage bin.

Very high production was achieved at an eastern Naval Base.

Speed in construction has always been important, but never as important as it is today. That is why many large contractors are using ready-mixed concrete to simplify their pouring problems; and that is why most of them turn to Butler for their plants. Butler plants have reached the unprecedented speed of 250 cubic yards of concrete per hour, for each is engineered to do its particular job.

Consult Butler about your plant problems; the best always costs less in the end.

BUTLER BIN COMPANY

WAUKESHA

WISCONSIN

ing floor sections had been concreted. At the start of tremie concreting operations it was necessary to complete several floor sections in each drydock. During this phase of the work the concrete plant delivered to two floor tremie barges operating simultaneously in the twin docks. After the work had settled down to normal procedure, the common practice was to deliver simultaneously to a floor tremie barge in one dock and to two wall tremie barges in the other dock. Four pumps delivered to a floor tremie barge, which ordinarily completed a floor pour (1,600 yd. for an alternate block and 1,664 yd. for an intermediate block) in 9 hr. Tremie concrete for the two wall barges was obtained from three concrete pumps (or from four, after the eighth pump was added to the concrete plant) to complete the two simultaneous wall pours of 1,670 yd. each in 21 to 22 hr.

Tremie Barges

For simultaneous construction of two drydocks, the contractors equipped the job with two floor tremie barges and four wall tremie barges. Each barge mounted a series of 12-in. spiral-welded tremie pipes up to 75 ft. long, made up of three sections of about 20 ft. and a section of about 15 ft. with a bell at the top; eight pipes were mounted on a floor barge and four pipes on a wall barge. For controlled vertical movement, cach pipe was suspended from a 112-yd. movable hopper on an Insley elevator tower. Vertical adjustments of the tower hoppers on groups of four towers were individually controlled during a tremie pour by Novo four-drum hoists powered by Buda gasoline en-

At the top of steel tower scaffolding on each tremie barge the concrete pipes delivered concrete to 2½-yd. hoppers which fed the tower hoppers. Each of the upper hoppers was equipped with two outlet spouts and individual discharge gates to serve two tremie pipes. When the tremie hoppers were lowered to the bottoms of the towers at the start of a tremie pour (and at the start of successive courses of wall pours after 20-ft. sections of tremie pipe had been detached), concrete was dropped from the upper hopper to the tower hopper through elephant-trunk spouts. Successive sections of the elephant trunk were removed as the tremie units were raised during the progress of the pour.

An operator riding on a platform attached to each tower hopper controlled the discharge from the hopper into the tremie pipe. At each of the upper hoppers a man was stationed to regulate the discharge into either of the two tremie hoppers fed from this point. Electric light signal systems controlled by pushbuttons signalled the wishes of the operators from the tower hopper to the upper platform and from the upper hopper to the concrete plant. Rais-

(Continued on page 108)



servation E

We pause in this series of informative articles for wire rope users to review briefly the 12 thus far published . . . and provide an opportunity for those who may not have seen them to obtain reprints.

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The purpose of this series of singlepage illustrated articles on wire rope conservation is to help you conserve your wire ropes. This helps you, and helps our country for it means conservation of steel. We shall be glad to send you any or all of the articles listed below which readers tell us are useful and helpful.

- Why Corrosion Shortens the Life of Wire Rope. Tells cause, effect, and suggests remedy for corrosion. Also explains how proper lubrication helps wire rope stand up against elements.
- 2 How Sheave Materials Affect Wire Rope Service. Pictures effect of hard and soft sheaves on wire rope. Explains what to watch for, how to avoid rope and sheave damage.

- 3 How You Can Lengthen Wire Rope Life by Proper Sheave Maintenance. Includes handy reference table on groove tolerances. Also points out 3 ways to save wire rope dollars.
- 4 The Importance of an Adequate Safety Factor. What is it? How Found? When is wire rope overloaded? What are minimum safety factors for various loads? All are answered in this easy-toread, informative article.
- 5 How Thorough Lubrication Lengthens Service Life of Wire Rope. Explains two lubricating methods. Shows effect (Pictures) of ropes left unprotected.
- 6 Correct Rope Reeving Saves Wire Rope Dollars. Discusses fleet angles, reverse bends, rope spooling and what to do about them.
- 7 Regular Inspection Saves Wire Rope Dollars. Lists 6 common causes of wire rope failure. All can be avoided if rope user follows simple inspection procedure suggested.

- 8 Select the Correct Wire Rope for Your Equipment - Save Time and Money. Explains how Flexibility, Abrasion Resistance, and Strength are determined to meet varying conditions of Bending Fatigue, Abrasive Wear, and Loading Stress.
- 9 3 Ways to Make Your Wire Rope Dollar Go Farther - Conserve Steel Tonnage Too. Especially valuable to men actually handling wire rope.
- O Corrosion in Wire Rope. Gives further information on how to combat this rope destroyer. Supplements informative article number 1.
- 11 Protecting Wire Rope Against Corrosion. Shows some results of forgetting to inspect and protect wire rope with proper lubrication.
- Practical Methods of Lubricating Your Wire Rope. Illustrates simple ways to lubricate your wire rope on the job. Very practical, useful for everyone concerned with wire rope care.

MACWHYTE COMPANY Manufactures:

 MONARCH WHYTE STRAND Wire Rope
 MACWHYTE Braided Wire Rope Slings
 MACWHYTE Aircraft Cables and Tie Rods • MACWHYTE PREformed and Internally Lubricated Wire Rope

MACWHYTE COMPANY, 2940 Fourteenth Ave., Kenosha, Wis. • Mill Depots: New York • Pittsburgh Chicago • Ft. Worth • Portland • Seattle • San Francisco • Distributors throughout the U. S. A.

How to get them

Just circle those you wish and attach coupon to, or write on, your business letterhead.

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SUCTION HOSE FOR EVERY SERVICE REQUIREMENT



Tie this, for flexibility! Twelve feet of "New-type Cord" Suction and Discharge Hose coiled to a diameter of approximately 30 inches.

EWTYPE CORD"

(U. S. PAT. NO. 1948410)

SUCTION and DISCHARGE HOSE

A strong, durable, smooth bore hose . . . light in weight, extremely flexible, easy to handle. Can be quickly rounded into shape without damage to tube or carcass, should it be accidentally crushed. Sizes: 11/4" in max. lengths of 100 feet, 11/2" to 4" in max. lengths of 50 feet.

SAND SUCTION HOSE...

"SPARTAN". A smooth bore hose for sand and dredge suction service. Tube has great resiliency, toughness and durability. Closely spiralled spring wire in carcass provides unusual flexibility and strength. Made in all standard sizes.

"DURATION QUALITY" PRODUCTS . . . Goodall "Duration Quality" hose, belting, boots and cloth are made of the best available materials and are engineered last longer than standardized emergency products. In seek ways to conserve rubber and other vital materials, Goodall gineers have developed in "Duration" brands, construction that are the envy of the industry.

GOODALL KNOWS SYNTHETICS...

Every day, we are "batching" four of the basic s rubbers for regular production runs in our factory. Wh synthetic or plastic substitutes become available, Goodal sits and technicians are ready with the precise formulas, and control techniques so essential to safe, dependable p

DREDGING SLEEVES ...

"STYLE S-74". Designed to insure tight yet flexible joints on pipe line from dredge. Highly resistant to abrasive wear. Sizes: 85/8", 131/4", 22" and 32" I.D., in any required length.

"STYLE S-75". Same as above but reinforced with metal cable in walls. Recommended for first few units from stern of dredge, or where unusually high pressures are encountered.

There is a Goodall branch or distributor convenient to

There is a Goodall branch or distrib your main office or job, ready to serve you on sbort notice. If you de-sire prices, catalogs or bulletins de-scribing specific products, our main office will forward your inquiry promptly.

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COMPANY

(Continued from page 106)

ing and lowering of the tremie pipes were controlled from stations on the deck of the barge by similar signal systems to the hoist house.

Tremie Concreting Methods

For the 7-sack concrete containing an aggregate of 2-in, maximum size, used for all the tremie work, a slump closely approaching but not exceeding 8 in. was desired. Navy inspectors made periodic slump tests of concrete delivered by the pipe lines to the hoppers on top of the tremie barge. In its downward trip from the delivery pipe to the bottom of the tremie pipe, the concrete made two long drops and about five angle bends. To minimize segregation, the tremie operators retained about 1 yd. in each tower hopper. Once a seal had been established in the tremie concrete, the maximum drop in the tremie pipe was about 40 ft. Test pours of tremie concrete showed no serious segregation.

Soundings made from a floating platform in front of the tremie barge kept a constant check on the elevation and profile of the tremie concrete during the progress of a pour. The tremie concrete was deposited on a stone blanket 2 ft. thick, above which the steel foundation piles protruded 3 ft. into the concrete. During a pour the surface of the tremie concrete was maintained on a slope to prevent trapping of mud or formation of pockets around reinforcing trusses in the steel form. The tremie concrete took an average slope of about 1 on 9.

In starting a pour, placing was controlled in such a way as to shove any mud which had collected on the stone blanket ahead of the advancing mass of concrete and against the wall of the form, where the mud could be picked up and ejected by an air lift. At the start of a pour in one of the large floor sections, concrete was deposited first from one of the central tremie pipes on the eight-tower barge, and adjoining pipes were not put into action until at least I ft. of concrete had collected around the foot of the pipe, as determined by soundings. The cenerete advanced toward the two sides of the drydock and trapped the surface mud against the sidewalls for ejection. In a wall section, much shorter than floor section, the pour started at one end and pushed the mud to the other end.

To effect a seal at the start of a tremie pour, a plug consisting of a plywood disk fitted with a canvas curtain and steel straps (to prevent the disk from revolving in the pipe) was used ahead of the concrete. This plug proved highly effective in damming the lower end of the concrete column and preventing entrance of water until the concrete reached the bottom and sealed the pipe. The plug was lowered by a winch-controlled steel cable until about 25 ft. of concrete had built up on top of it; the cable then was released and was lost in the concrete along with the plug.

When starting a pour, two concrete (Continued on page 110)



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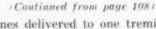
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pipelines delivered to one tremie pipe, in order to maintain a heavy flow of concrete, and the two hoppers feeding the tremie pipe were filled before any concrete was discharged. Slide valves devised by the concrete superintendent and illustrated in an accompanying drawing facilitated the tapping of an extra pipeline at the upper hopper. Gates of both hoppers were left open to discharge a steady stream of concrete until the tremie concrete had built up to a depth of 5 or 6 ft. around the bottom of the tremie pipe.

During the pour the tremie crew kept the bottoms of the tremie pipes buried in 5 or 6 ft. of concrete. No seals were lost during normal tremie operations in either floor or wall pours.

Tremie Test Blocks

Before undertaking actual tremie work in the drydocks, the constructors tested their equipment and procedure by placing tremie concrete in 10x12x 11-ft. blocks in steel forms on a bed of rock under a full head of water, duplicating actual working conditions. In these blocks the concrete tested was a 6.3-sack or 7-sack mix, placed with a cone-shaped foot-valve on the bottom of the tremie pipe. The cone foot-valve, which had a rounded (almost hemispherical) bottom, was suspended by a steel cable at the bottom of the tremie pipe and was guided and held in alignment with the pipe by four short steel rods which passed through oversize holes in a steel collar on the outside of the tremie pipe at its lower end. Purpose of the device was to control flow by opening or closing the valve. In practice it was found that opening and closing of the foot-valve could not be controlled from the surface, and the foot valve was discarded.

Test blocks were removed from the water and were drilled and blasted to expose the concrete for study. The concrete was found to meet all requirements. To determine the bond strength of the concrete on a steel foundation pile, as required to resist uplift through the center of an unwatered drydock, a test block was cast over a short length of steel H-pile, extending upward 3 ft. into the concrete. After the test sample had been removed from the water, a tension test on the pile revealed a concrete bond strength of 70 tons. The specifications required that drydock foundation piles be driven to 371/2 tons bearing as determined by the Engineering News formula. Where the required bearing was not reached, wood piles were driven for further consolidation.

Concrete Mix

For 7-sack, 8-in. slump concrete desired for tremie placement, a 11/4-yd. batch proved to be the most practical size to prevent spilling from the 34E dual-drum mixers. A typical 114-yd. batch contained 827 lb. of cement, 1,390 lb. of sand, 1.690 lb. of 1-in. gravel, 800 lb. of 2-in. gravel and 376 lb. of



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And Salvage Waste Lumber For Bracers · Spreaders · Stoppers

This powerful, fast-cutting MALLSAW reduces form This powerful, fast-cutting MALLSAW reduces form construction to a few simple operations. It assures perfectly square board ends, eliminating fins and projections. It permits a carpenter to gang and cut boards for entire section at one time. It does away with awkward hand sawing below grade as boards cut to size can be passed to the man in the trench faster than he can nail them in place. And, in addition, it enables contractors to use small ends and pieces ordinarily discarded.

MALLSAWS are balanced for safe, one-hand use, easily and quickly adjusted for depth and bevel cuts to 45 degrees, simple and easy to use. A Big time and labor saver for War Projects.

Write AT ONCE for literature and prices.

** THROW YOUR SCRAP INTO THE FIGHT

MALL TOOL COMPANY

7757 South Chicago Ave., Chicago, Illinois



24-FOOT LENGTHS From Footing to Sill in 4 Quick Steps



FIGURED

The pier heights above footings for an entire building are figured at one time and turned over to sawyer.



Sonotubes arrive on job up to 24' long-light, easy to handle - plac-ed in cradle and cut with hand saw to proper lengths. (Laminated fibre easy to cut).



SET

Placed in position and aligned on footings. Minmum bracing for tall piers (up to 10 ft.) Backfilling sufficient for short piers.



POURED

Sill braces set, and troweled off piers are soon ready for sills. No stripping is necessary. Wax treated forms will slough off eventually.

APPROVED

ARMY ENGINEERS NAVY DEPARTMENT YARDS & DOCKS PUBLIC SOLDING ADMINISTRATION FEDERAL HOUSING ASTROBITY

Write for delivered prices

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MYSTIC CONN

water. This water requirement is based on saturated surface-dry aggregate. Actually, only a couple of hundred pounds of water needed to be added to each batch from the weighing tank.

Crushed material was limited by specification to 25 percent, although the engineers in charge permitted this percentage to be exceeded slightly on several occasions when the job otherwise would have been shut down for lack of acceptable aggregates. For pumping through pipelines liberal sanding of the mix was beneficial, but the high slump required for effective tremieing was detrimental, as the fluidity of the concrete invited settlement and jamming of the coarse aggregate in the pipe.

Materials Requirements

When producing concrete at a rate of 350 yd. an hour the plant had to handle in each hour 195 tons of sand, 237 tons of 1-in. gravel, 102 tons of 2-in. gravel, and 106 tons (or 612½ bbl.) of cement. In a 6,000-yd. day the plant required 11,300 tons of dry materials, made up of: sand, 3,340 tons; 1-in. gravel, 4,060 tons; 2-in. gravel, 1,920 tons; cement, 1,980 tons.

General Plant Layout

Accompanying diagrams and drawings show the general arrangement of the plant. A bank of five Ransome 34E dual-drum mixers, driven by G-E 50-hp. motors, was set above a line of seven Rex double-chambered 7½-in. Pumpcrete machines powered by Howell 50-hp. induction motors. The line of concrete pumps was increased by the addition of another unit for the final 250,000 yd. of tremie concrete.

To expedite replacement of concrete pumps which had to be pulled out of service for repairs or periodic overhaul, the plant carried a reserve concrete pump on a transfer car which ran on a railway behind the line of seven working pumps. An empty transfer car on the same railway removed the concrete pump marked for replacement, and the reserve pump was shifted into the vacated position and hooked up to the pipeline. By this method the entire operation of replacing a pump could be completed in about 35 min.

Butler bins and weighing batchers served the five mixers, an individual set of batchers being mounted above each mixing unit. Sand and the two sizes of coarse aggregates were discharged through manually operated gates into a central hopper in which they were weighed by individual beam scales. Electric relays hooked up to beam scales controlled the shut-offs on delivery of cement and water to their weighing hoppers.

Cement was delivered to a 3,000-bbl. storage tank by a pipe conveying system utilizing dry, low-pressure air. Aggregates were unloaded from barges into storage bins on a wharf not far from the plant. From these bins belt conveyors carried the sand and two

(Continued on page 113)



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(Continued from page 111) sizes of gravel to the 330-yd, overhead bins in the concrete plant.

At the aggregate unloading dock, two Speedcranes worked steadily transferring sand and gravel from 1,000-ton scows into steel bins above a belt conveyor. The bins, 175 ft. long, with a capacity of 2,800 yd., were divided by partitions into eight 350-yd. compartments, two for 2-in. gravel and three each for sand and 1-in. gravel. Addition of an auxiliary unloading hopper and elevated 24-in. belt conveyor 100 ft. long delivering to two compartments at one end of the bin improved the flexibility of the arrangement and made it possible to unload from three 100-ft. barges alongside the wharf.

Each of the Manitowoc two-speed cranes (operated in low speed to handle an Owen rope-reeve 3-yd. waterlevel clamshell bucket on a 75-ft. boom) could average 150 to 175 yd. per hr., including the cleaning up of the boats. A small power launch able to maneuver in the restricted area of the barge basin took out an emptied barge and replaced it with a loaded barge without causing any time loss to the unloading cranes. When concrete was being placed at a rate of 350 cu.yd. an hour, the hourly consumption of aggregates was about 420 yd., comprising about 150 yd. of sand, 185 yd. of 1-in. gravel, and 87 yd. of 2-in. With the reserve supply in the 2,800-yd. storage bins, the two cranes, with a combined loading capacity of about 325 yd. an hour, were able to keep up with all demands of the concrete plant when the concrete production did not exceed 5,000 yd. in 24 hr. For handling heavier demands, the plant superintendent brought in a third crane, a Lorain machine which operated in high gear and handled a Hayward power-wheel 2-yd. clamshell on a 75-ft. boom. This unit worked as many hours as required, transferring material into the hopper feeding the auxiliary conveyor.

Belt Conveyors

Drive units of the belt conveyors, as well as all other electric motors of the contractor's plant, operated on 440-v. alternating current. For overload safety, belt-conveyor units were overpowered 50 to 100 percent. The auxiliary conveyor, 100 ft. by 24 in., rising on an 18-deg, angle with the horizontal (the maximum for an inclined belt conveyor) was driven by a 10-hp, headshaft motor.

From the aggregate storage bin to the overhead bins in the concrete plant, the conveyor system was made up of Barber-Greene units carrying Goodyear belts on roller-bearing idlers and babbitt-bearing pulleys. The belts were uniformly 36 in. wide. Under the bins at the unloading dock, a 175-ft. belt driven at 300 f.p.m. by a 15-hp. head motor delivered to the boot of an inclined conveyor 500 ft. long which rose a vertical distance of 67 ft. to the top of the concrete plant. The head pulley

(Continued on page 114)



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Engineers - here's one of the sturdiest, flexible steel tapes money can buy - the Lufkin "Peerless" Chrome Clad Steel Tape. The quarter-inch line is heavy for added service, narrow enough for easy handling. Even in poor light, the jet black markings are easy to read against the satin chrome surface that won't rust, crack, chip or peel. The sturdy four-arm steel frame has a smooth-working winding mechanism - and it locks the tape at any desired point. See the "Peerless" at your dealers and write for free copy of Catalog 12-c.



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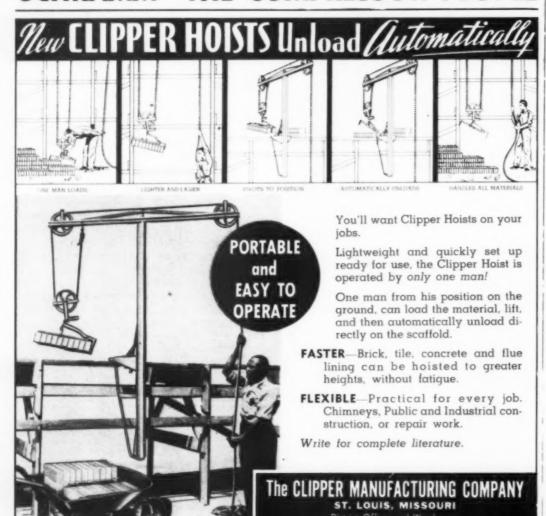


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(Continued, from page 113)

of this riser conveyor, with a belt speed of 320 f.p.m., was driven by a Westinghouse 100-hp. linestart motor and Westinghouse gear motor through a multiple-link chain drive. Head pulleys of the other conveyors likewise were driven by multiple-link chains through gear reductions from the motors. At the top of the concrete plant a 21-ft. conveyor driven at 350 f.p.m. by a 10-hp. motor carried material to turnheads feeding the plant bins. Gravity-takeups were used on the 175-ft. and 500-ft. conveyors; the shorter belts were equipped with screw take-ups.

Plant Bins

Compartments for the three sizes of aggregate in the plant bins were long and narrow, the bins being divided by longitudinal partitions. The conveyor system was designed to feed sized aggregates into the 110-yd. compartments through two turnheads near the ends. This method of filling the compartments piled up the material at two ends and allowed the aggregates to spill down the slope toward the valley in the center, causing natural segregation, particularly with the coarse material. To prevent this segregation, transverse partitions were erected in each longitudinal compartment to divide it into three pockets, and a chute was installed to fill the central pocket from one unloading point, as shown by the accompanying plant drawing.

Unloading Cement

Bulk cement was unloaded from barges carrying loads of about 5,000 bbl. by two Fuller-Kinyon remotecontrol unloaders which delivered 80 tons each per hour (a total of 160 tons) through an air-pipe conveying line to the 3,000-bbl. cement storage bin at the concrete plant. Accompanying photographs illustrate the unloading equipment. Two rotary feeder disks on each unloader were powered by Master 5-hp. gear-head electric motors, and a screw conveyor in the machine, feeding the cement conveying line, was turned by a Westinghouse 150-hp, induction motor to which the screw was directconnected through a magnetic clapper switch. By means of the remote control device, the operator of the unloader was able to stand on the deck of the barge and direct the movement of the machine in the hold. The hand control unit included a switch to start the cement-handling motors on the unloader and a simple gravity control for regulating the operation of two Master 3hp. gear-head motors driving the pneumatic-tired wheels on which the machine was mounted. By revolving the gravity control with his hand, the operator could move the unloader right. left or reverse. A third unloading machine was kept in reserve to avoid interruptions of cement delivery while any of the unloaders was being overhauled.

Low-pressure hot air to aerate the (Continued on page 116)



14-Ton Welcoming Committee

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MIXERS . PUMPS . HOISTS BATCHING & PLACING EQUIP. SAWS . CARTS . BARROWS (Continued from page 114)

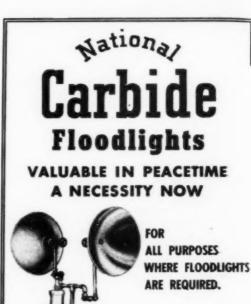
cement in the conveying lines was supplied to the two unloaders by a pair of Fuller rotary compressors, each of which furnished 1,350 cfm. of 40-lb. air at 585 r.p.m. The compressors were driven by Louis Allis 150-hp. squirrelcage motors to which they were directconnected by means of wood dowels through matching flywheels on the drive shaft of each unit. In event of compressor trouble, the direct-drive could break at the dowel connection without overloading the motor or causing greater damage to the compressor.

Batching Operation

Batching all ingredients for a 11/4-yd. batch ordinarily took 25 to 30 sec. After opening the water valve and starting the cement screw by pushbutton control, the operator weighed out the aggregates, closing the manually controlled gate for each material when the needle of its individual dial indicator reached the center point on the dial. Weighing of aggregates took about 5 sec. for 2-in. gravel, about 10 sec. for 1-in. gravel, and about 8 sec. for sand, a total of about 23 sec.

Automatic electric cutoffs stopped the cement screw and shut the water valve when the proper weights were reached. Individual needle indicators enabled the operator to check the weights of these ingredients also. A large flywheel was mounted on the drive shaft of each cement screw, powered by a Howell 71/2-hp. motor. When the density of the cement had been decreased by aeration in the conveying system, this flywheel tended to keep the shaft turning after the motor had been shut off, thus feeding an excess of cement into the weighing hopper. To stop this cement overrun, the foreman of the concrete plant mounted on the opposite end of each flywheel shaft a Mack truck brake (used on the jack shaft of the truck) and hooked it up to a hand lever in front of the batchers, where the operator could apply the brake to shut off the cement screw. When the screw failed to deliver the required amount of cement, the operator pushed a button to operate a slowspeed incher which supplied the deficiency. A similar incher opened the water valve to make up any shortage of water in the weighing tank. To maintain a balanced pressure aiding accurate measurement of water in the weighing batcher, the water in the overhead supply tank was held at a uniform level by a pair of float valves controlling the intake from two feed pipes

To charge the mixer, the mixer operator pushed a button which started electric relays controlling the delivery of concrete ingredients to the mixer drum. The first ingredient to be released was the water, discharged through a 5-in. pipe into the mixer. By changing the water weighing batchers from tanks with a 21/2-ft: head to taller, narrower tanks with a 5-ft. head, the



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Page 116 - CONSTRUCTION METHODS - November 1942

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plant superintendent reduced the water discharge time by 50 percent to a figure of from 11 to 15 sec. The electric relays released the aggregate batcher 5 to 7½ sec, later, and the cement batcher at the end of another 2 sec. All the ingredients were in the mixer drum by the time the water ceased to flow.

Concrete Mixers

Five Ransome 34E paver-type dualdrum concrete mixers were lined up directly under the batchers, as indicated by the accompanying drawing of the concrete plant, to serve the eight (originally seven) concrete pumps on the lower level. Each mixer was driven through a six-rope V-belt drive by a G-E 50-hp. motor. Batchmeter time controls for the two compartments of each dual-drum mixer were set for 35 sec, in the first drum and 40 sec, in the second. Discharge of a batch from the second compartment required 11 sec., and transfer of a batch from the first compartment to the second took 13 sec. At the end of the transfer period, the mixer operator closed the transfer chute and started the automatic relays controlling the discharge of batch ingredients into the first compartment. Operating on this cycle, a mixer turned out a batch every 571/2 sec.

As shown on the plant drawing, each mixer could deliver to three concrete pumps, and batches frequently were split two or three ways. To keep a check on the quantity of concrete being put through each pump, three fare meters from old trolley cars were mounted above each mixer. After discharging a batch, the man in charge of the discharge chute rang up the distribution of the batch, one pull on a meter cord for each third of the batch. This count served as a rough check on the amount of concrete being pumped to each of the various tremie forms being filled at one time.

Concrete Pumps

For placing the second half of the total of 500,000 cu.yd. of tremie concrete, the contractors used eight Rex 200 double Pumpcretes mounted on flanged steel wheels to roll on steel rails. As indicated by the drawing, the original installation of seven concrete pumps was served by a transfer railway at the rear of the line of Pumpcretes. The eighth Pumpcrete, set at a lower level, could not be served by this railway.

After every 3,500 yd. of pumping, the Pumpcrete unit was pulled out of line for general inspection and overhaul. Maintenance mechanics replaced inlet and discharge valves only when necessary, but installed new seals in the course of each overhaul job. The rubber heads on the pump pistons, working in water-cooled and water-lubricated piston chambers, seldom needed to be replaced. Worn valve sleeves were built up by electric welding and by hard-facing the edges with alloy steel elec-

(Continued on page 118)

Like

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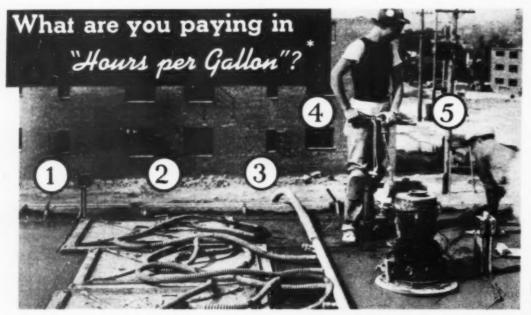
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They concrete two hours longer every day, and still have the cement finishers off the floor 4 to 6 hours earlier these cool Fall nights — And get 28 day strength in 3 days as well!

In the picture above:

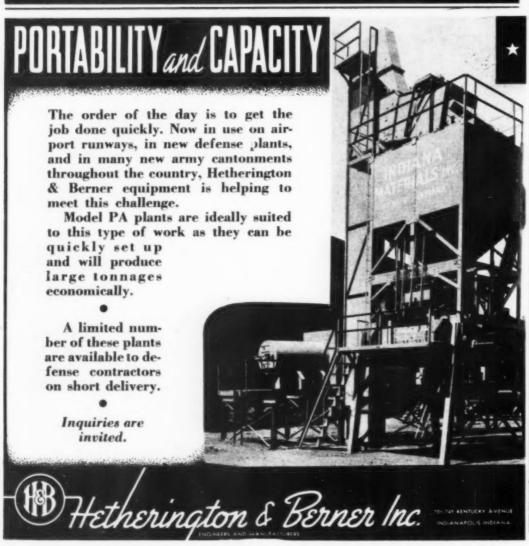
- Fresh concrete: 6" slump. VACUUM-suction mats
- 3. Suction line to truck-mounted VACUUM-pump
- on ground.

 4. VACUUM-dewatered concrete hard enough to walk on: power floating started.

Steel-troweling follows

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(Continued from page 117)

trodes. Inlet valves likewise were rebuilt by welding. The contractor's mechanics made new valves in the job machine shop, at a saving.

Each concrete pump was driven by a Howell 50-hp. induction motor. To prevent rod breakage in case of a blocked valve, the rods operating the inlet and outlet valves were cushioned by double-acting springs in tubular housings.

Concrete Pipes

Pipe lines for concrete delivery were made up of 10-ft. sections of 8-in. pipe with quick-acting toggle couplings. At points where bends in the pipelines varied with the rise and fall of the tide. sets of flexible joints were used. Along the pipe-racks on the temporary pier. and on the floating equipment, the concrete crew maintained a full set of reserve pipe sections for quick replacement of an entire line in case of a plug.

In general, plugs in the pipe lines were most likely to be caused by concrete made with dirty aggregate or with aggregate containing an excess of grits in combination with coarse sand. At times the job accepted dredged sand with a fineness modulus of 3.4, considerably higher than the specified fineness modulus of 2.6 to 2.9. When using coarse sand, plugs were frequent if the mix was not changed to compensate for the unusual coarseness. The plugs gen-

erally formed in the pump valves or in the Y-connection. Improvement of the Siamese Y-con-

nection at the concrete pump was the greatest single factor contributing to the continuous flow of concrete. Oldstyle Siamese Y-connections with a 10in. outlet, reduced to 8 in. through a special connecting tapered pipe section, caused frequent plugging in the tapered section and required breaking of the pipe at this point and cleaning of the pumps. When the old-type units were replaced with the new Siamese Y-connections, of uniform 8-in. outside diameter, trouble at the junctions was eliminated, and the pumps frequently could run 24 hr. or longer without any plugging at the Y-connection.

Three Gorman-Rupp triplex pumps were available at the concrete plant for cleaning several pipe lines with go-devils at one time. The pumps were capable of developing pressures of about 1,250 lb. per sq. in., but 300 to 500 lb. was sufficient to force a go-devil through a pipe, depending upon the length of the line.

High concrete temperatures resulted from the high cement factor in the mix. Temperature tests of tremie concrete by thermo-couples gave readings of 160 deg. F., 3 days after the concrete had been placed. This concrete left the concrete plant at temperature of about 60 deg.; the average for the job was nearer 72 deg. On a hot day the temperature could rise 10 deg. during transit through the pipe lines. To prevent this

(Continued on page 120)

PARSONS





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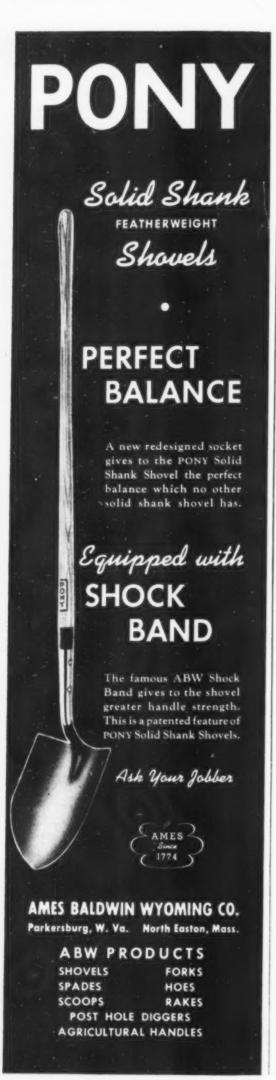
For Speedy, Convenient Trenching

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For complete details write The Parsons Company, Newton, Iowa







(Continued from page 118)

rise, the pipe lines were kept wet with hose streams.

Booster Pumps

A floating booster unit equipped with four concrete pumps was used on long lines. The job ordinarily made use of three lines to deliver to the boosters. With four pumps on the booster barge and eight in the concrete plant, including the reserve unit, the delivery system required 12 Pumpcretes.

Direction

The drydocks described in these notes are being constructed for the Navy Department under a contract negotiated and administered by the Bureau of Yards and Docks of the Navy Department and its local representatives on the site of the work. The docks were designed by Dry Dock Engineers, of New York City, made up of four firms: Frederic R. Harris, Inc.; Parsons, Klapp, Brinckerhoff & Douglas; Moran, Proctor, Freeman & Mueser; and Fay, Spofford & Thorndike. The contractors are a combination of four companies which have united temporarily to handle this project. The firms are the Walsh Construction Co.; J. Rich Steers, Inc.; the Cauldwell-Wingate Co.; and the Raisler Corp.

> Women Replace Men

On Oregon Highway Maintenance

(Continued from page 63)

through the lack of men, that it became necessary either to shut down the work or to employ women. Before that time we had nearly exhausted the supply of boys and elderly men capable of performing the arduous duties incident to highway maintenance.

After a trial period of about four weeks, the Oregon State Highway Department is now in a position to say that it is entirely satisfied with the way women have performed their jobs. The truck drivers have been more careful, more dependable and easier to instruct than the general run of male drivers. The flagmen are more courteous and efficient than the men we have had heretofore. It has even been found that such highly specialized work as road-roller operation can be performed efficiently by the so-called weaker sex.

The accompanying photographs illus-

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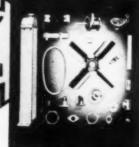
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trate the type of work performed by women on a paving plant patching crew near Marshfield, Ore. This crew employs 7 women whose average age is 30 yr. All but one are married. The husbands of two are with the armed forces; the rest are housewives who have taken on this extra work as their contribution to the war effort.

Next summer the state highway department plans to employ many women in the extra-gang maintenance work. The highways of this country must be maintained, and, as long as we can find women with intelligence and stamina evidenced by those already employed, we have no fears of the ability of this department to give the road transportation service the war effort requires.

It is indeed a tribute to the women of America that they are willing to take such hard jobs, and only one more indication of the fact that the American people are rapidly leaving the soft way of life and are quickly adapting themselves to fight the total war for survival in which we are now engaged.

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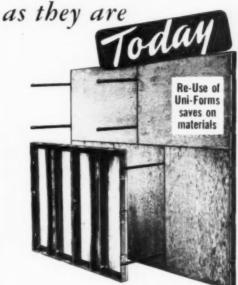
(Continued from page 68)

oil pipeline and the locations of their sections of the project are: Williams Bros. Corp., Tulsa, Okla., from Longview, Tex., to Arkansas-Texas state line; O. E. Dempsey Construction Co., Tulsa Okla., from Arkansas-Texas state line to Gurdon, Ark.; Anderson Bros., Tulsa, Okla., from Gurdon, Ark., to Arkansas River at Little Rock, Ark.; Oklahoma Contracting Co., Dallas, Tex., between Little Rock and St. Francis River at Missouri-Arkansas state line; C. S. Foreman Co., Kansas City, Mo., between St. Francis River and Illmo, Mo., on Mississippi River; Ray E. Smith Construction Co., Eldorado, Kan., between Illmo and Harrisburg, Ill.; and Sheehan Pipe Line Construction Co., Tulsa, Okla., between Harrisburg and Norris City, Ill., and 14-mi. branch line from Norris City to Mount Vernon, Ind.

War Emergency Pipeline, Inc. is an organization formed to construct the war facilities implied in its title, and is composed of most of the large oil producers of America. Work on this highly important line is being pushed with all possible speed. Harold L. Ickes, Secretary of the Interior and Oil Coordinator, has announced that the line would be completed and in service by Christmas, 1942.

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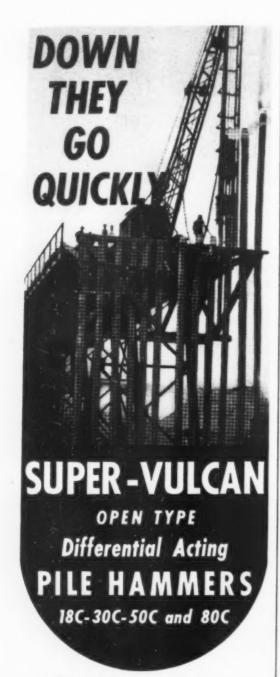
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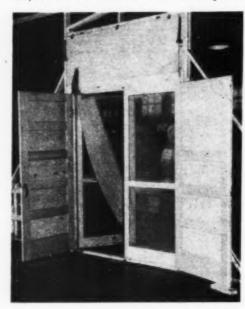
Illinois

Power Tools Speed Shop Fabrication of Military Huts

(Continued from page 66)

radius at the factory. Interior walls and ceiling are lined with ½-in. compressed fiber insulating board, which is adequate for temperate climates. Horizontal joints are made with metal splines, and vertical joints are covered with wood battens. For use in cold and tropical zones, a heavier lining of 1-in. fiber board is applied. The flooring is ½-in. plywood screwed down to 2x4-in. wooden sleepers laid longitudinally across the steel joists.

Total weight of all the crated parts for a standard 20x48-ft. hut is less than 10,000 lb. The full set of crates requires



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Accompanying illustrations show factory methods employed to speed prefabrication of parts for the military huts. Rib units are fabricated in halves to be joined by a bolted angle splice in the field. Each half is made up at the factory of several segments of Stran-Steel 2x35/8-in., 16-gage stud section bent and spliced by welding at the joints. Special

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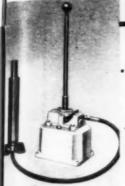
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jigs aid the fabrication of the ribs and of the doors and panels for the end bulkheads. Corrugated roof sheets are rolled to proper curvature in culvert rolls.

Applications of wood saws for making straight and circular cuts in plywood end panels are particularly worthy



STILL IN VERTICAL POSITION, complete door panel is crated in wood strips marked for use in military huts; practically no waste lumber is included in packages made ready for shipment.



INSULATING BOARD, metal splines, wood units and various other items are placed in box car for shipment.

of note. These operations are illustrated by several of the photographs. Production of the military huts is

Production of the military huts is carried out in the Ohio factory by the J. & B. Manufacturing Co., organized by the two associated Texas contractors to fabricate the buildings under contracts awarded by the Army to S. Perry Brown & Associates. J. L. Morley is general manager of the plant.

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(My commission expires March 30, 1942)

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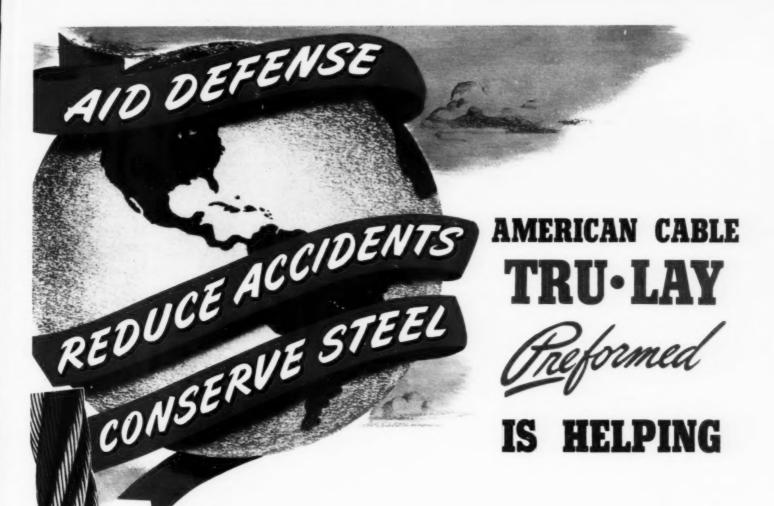
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